The Dissertation Committee for Katherine Leigh Arrington certifies that this is the approved version of the following dissertation:

Texas's House Bill 5 as Modern Tracking Structure:

Social Stratification Reified?

Committee:

Pedro Reyes, Supervisor

Philip Uri Treisman, Co-Supervisor

Jennifer Jellison Holme

Terrance Green

Texas's House Bill 5 as Modern Tracking Structure:

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Katherine Leigh Arrington

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Texas's House Bill 5 as Modern Tracking Structure:

Social Stratification Reified?

Katherine Leigh Arrington, Ph.D.

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Supervisor: Pedro Reyes

Co-supervisor: Philip Uri Treisman

In 2013, Texas policymakers passed House Bill 5 (HB 5), which changed high school graduation requirements to a multitiered set of plans called the *Foundation High School Program* (FHSP). This hierarchical set of graduation plans groups students based on a chosen career endorsement and offers different content instruction based on their choices, mirroring tracking structures that categorize students into groups and then provide those groups with dissimilar instructional experiences. This project investigated whether HB 5 is achieving the hope of the bill's authors—to increase student engagement through allowing students to choose programs tailored to their career aspirations—or if the policy functionally operates as tracking. This study used a quantitative analysis of the data available through the Texas Education Agency (TEA) to look for descriptive patterns in the offerings and outcomes for students using the predictor variables of the type of or urbanicity of the district and the racial and socioeconomic composition of each district. Generalized linear models and generalized linear multilevel models indicate the extent to which relationships between both the HB 5 graduation plan offerings in each district and outcomes for students enrolling and graduating

under the HB 5 plans and the district's characteristics. This study found significant differences in the endorsements offered by districts based on urbanicity of the district, specifically differences between rural districts and the rest of the state. The study found differences in who was enrolled in FHSP while enrollment was considered optional, with significant differences by year and for those students enrolled in rural districts as well as specifically for students in districts with higher proportion of African American/Black and Hispanic/Latino students. There are significant differences in graduates under FHSP who earned the distinguished level of achievement based on these predictors and specific differences in the odds of students in suburban districts with higher proportions of African American/Black students graduating under FHSP and earning the distinguished level of achievement. Implications indicate that FHSP operates as a means to uphold the system of student tracking.

Keywords: tracking, stratification, student choice, Texas House Bill 5, endorsements

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CHAPTER 1

Introduction

The American dream depicts our country as a land of opportunity where social and economic class is not destined based on lineage and ancestry, but mobile and accessible to anyone willing to work hard enough and earn themselves a better life. Hochschild and Scovronick (2003) describe the American dream as an "unwritten promise that all residents of the United States have a reasonable chance to achieve success through their own efforts, talents, and hard work" (p. 20). This conception of meritocracy was at the forefront in the creation of the American education system, which according to Labaree (2011) was designed to serve the purpose of creating "citizens with the knowledge, skills, and public spirit required to maintain a republic and to protect it from the sources of faction, class, and self-interest that pose the primary threat to its existence" (p. 384). The common educational experience of all citizens offers credence to the ideology that each and every citizen has the chance at success and upward social mobility and is a structure that works against establishing fixed factions and classes in society.

In the 1800s, elementary schools were established to provide shared learning experiences and civic foundations for each citizen, preparing them to participate effectually in a republic (Labaree, 2011). Early in the 20th century, public secondary schools began opening to develop the knowledge and skills needed for success in an increasingly complex society. Importantly, secondary schools were not open to all and therefore did not provide a common experience for all citizens. Instead, the schools were primarily available to elite citizens, those who were White and of higher socioeconomic status (Flood, King, Ruggles, & Warren, n.d.), with the purpose of developing proficiencies needed for employment in the modern job market such as foreign

languages, surveying, navigation, and bookkeeping (Wraga, 2010). These skills were developed in individuals so that each could find his or her place in society and use this knowledge to better both him/her and society. Labaree (2011) posits that this was the beginning of a school system with a mixed purpose. Rather than maintaining a purely public mission, the school system now worked to further private interests, but only for part of the population. When secondary school was introduced to just a portion of the population, those who had the privilege of attending gained an edge in the competition for gainful employment. Over the century since public secondary schools were introduced, these already privileged educational consumers' desire to maintain or increase their social advantage through schooling has led to education being treated as a commodity (Labaree, 2011). Those with power in the education market, generally the wealthy and White, drove the system to expand in ways that provided them special access to the advantage of schooling at higher levels than were offered to everyone else. Rather than the education system preventing established factions and classes in the republic of the United States, the power to earn educational credentials valuable to the individual and available only to some through the public education system reified social stratification in the American society.

This destabilization in the purpose of the American education system, from serving the public good and providing a common education to a mixed purpose that includes providing a private good with exclusive access to social advantage through higher levels of education, has resulted in a consequential structure in our secondary schools called *tracking* (Labaree, 2011). Oakes (2005) defines tracking as "the process whereby students are divided into categories so that they can be assigned in groups to various kinds of classes" (p. 3). Tracking classifies students by characteristics, including their perceived ability (often based on locally constructed measures), interests, or aptitudes. Oakes (2005) denotes that these groups are hierarchical in

nature, and students in high, average, and low groups experience school and are regarded by the school system in tremendously different ways.

The Impacts of Tracking

Tracking structures present inequitable opportunities to students in low versus high tracks, so it should be no surprise that the outcomes students attain through different tracks are also unequal (LeTendre, Hofer, & Shimuza, 2003). Rubin (2008) found that students placed in lower track classes complete curriculum requirements more slowly, performed generally worse in school, and scored worse on standardized tests than students starting at the same ability level who were placed in mixed- or high-ability groups. Anderson and Oakes (2014) found that "students achieve less than classmates with the same ability who are places in higher-level tracks" (p. 114), reinforcing the idea that tracking results in increasing differences in the outcomes students achieve rather than helping address the needs of students placed in disparate groups. Anderson and Oakes (2014) also showed that students with high and low test scores do better when they are in higher level courses, likely due to the higher level instruction and learning activities characteristic of more advanced courses discussed later in this paper. The difference in outcomes are so great that Gamoran (1987) discovered that the achievement gap between low- and high-track students' performance, in mathematics specifically, was more than three times larger than the gap between students who leave high school without graduating and vocational-track students who graduated. The gap is also larger between low- and high-track students than between dropouts and low-track students in other subjects as well, including reading, science, and vocabulary. In other words, students in low tracks are disadvantaged to the point that they are closer in performance to students who dropped out of school than they are to students with the privilege of placement in high tracks.

The National Education Association (NEA) has a research spotlight on its website (n.d.) that focuses on the practice of ability grouping, addressing both within class and between class forms of tracking. NEA clearly states in this research spotlight that it encourages the elimination of the use of such groupings. It refers to the use of such practices as "discriminatory academic tracking based on economic status, ethnicity, race, or gender" (paragraph 6) and calls for the practice to be eradicated from all public school settings. Anderson and Oakes (2014) also demand an end to the homogeneous grouping used in tracking and suggest heterogeneous groups be used instead. They not only contend that tracking begins with inequitable placements of students, but it imparts upon students profoundly different learning opportunities through the varied tracks. As differences accumulate over the years, advantage flourishes for some students, and extreme hindrances accrue for others. Anderson and Oakes (2014) put it simply, "Tracking does more harm than good" (p. 109). Hierarchical, multitiered instructional systems increase stratification both through providing benefits to those students in higher tracks and obstructing the learning and opportunities for those in lower tracks.

Tracking, the multilayered hierarchical grouping approach to instruction, allows the educational system to maintain broad access to schooling for all students in an appeal to the traditional American ideal of providing everyone with an education needed to be productive citizens and simultaneously deliver the exclusivity of a more rigorous education for those with social advantage. These structures, which increasingly depend on student choice for placement rather than assignment by school officials, provide differentiated opportunities, resources, and expectations that result in gaps between races and classes in achievement, graduation rates, and college-going (Oakes, 2005), reifying existing social stratification.

Texas Context

Texas recently passed legislation that mandates all school systems across the state offer a multilevel, hierarchical set of graduation plans called the *Foundation High School Program* (FHSP). Portions of House Bill 5 (HB 5), passed into law by the Texas Legislature in 2013, took effect in the 2013–2014 school year. The FHSP graduation plans became effective and mandatory with the freshmen class of 2014–2015, though all students enrolled in high school prior to 2014–2015 had the option of transitioning to this new graduation program (Texas Education Service Center 20, n.d.). Students in the class of 2018 were freshmen in 2014–2015 as these plans went into place; they will be the first class to graduate with all four of their high school years under HB 5 graduation plans. The graduating class of 2017 is the last class to graduate with anyone still eligible for the previous graduation program, which had more extensive course requirements for graduation. While the data about the class of 2017 include students on the previous graduation plans, it was imperative to begin examining the data from the HB 5 plans for patterns and trends and ascertain if any of the adverse characteristics of tracking in Texas schools are emergent under this new policy. While the data available for this study pertain to the initial years of implementation, they provide early understandings of the offerings and outcomes under the HB 5 plans and point to essential questions for future studies as years of data under full implementation become available.

HB 5 graduation plans introduced the basic Foundation plan, five possible career endorsement choices that are layered on top of the foundation, and the distinguished level of achievement designation that can be earned by accomplishing some additional requirements. The foundation plan requires students to earn 22 credits (Table 1).

Table 1: Foundation High School Program Course Requirements

Discipline	Foundation HSP
English Language Arts	Four credits • English I • English II • English III • An advanced English course
Mathematics	Three credits • Algebra I • Geometry • An advanced math course
Science	Three credits • Biology • Integrated Physics & Chemistry or an advanced science course • And advanced science course
Social Studies	Three credits • U.S. History • U.S. Government (one-half credit) • Economics (one-half credit) • World History or World Geography
Physical Education	One credit
Languages Other Than English	Two credits in the same language Two credits from Computer Science I, II, and III (other substitutions)
Fine Arts	One credit
Speech	Demonstrated proficiency in speech skills
Electives	Five credits
Total Credits	22

Texas Education Agency (n.d. an)

Four of the career endorsements offer a course of study in preparation for the career categories of Science Technology Engineering and Math (STEM), Business and Industry, Public Services, and Arts and Humanities. A fifth career endorsement, Multidisciplinary, is available for students not participating in one of the defined career categories. Each endorsement requires students to complete the Foundation plan requirements in the core areas plus four additional credits,

including an additional advanced course in each content area of math and science as well as selected electives aligned to their career pathway (Table 2). Students can earn multiple endorsements or change endorsements during high school. School districts are only required to offer one endorsement to students; if only one is offered it is required to be the Multidisciplinary endorsement (TASA Summary, n.d.).

Table 2: Required Course Work in Addition to Foundation Plan to Earn a Career Endorsement

Endorsements	A student may earn an endorsement by successfully completing • curriculum requirements for the endorsement • a total of four credits in mathematics • a total of four credits in science • two additional elective credits
STEM	A coherent sequence or series of courses selected from one of the following: • Career and technical education (CTE) courses with a final course from the STEM career cluster • Computer science • Mathematics • Science • A combination of no more than two of the categories listed above
Business and Industry	A coherent sequence or series of courses selected from one of the following: • CTE courses with a final course from the Agriculture, Food, & Natural Resources; Architecture & Construction; Arts, Audio/Video, Technology & Communications; Business Management & Administration; Finance; Hospitality & Tourism; Information Technology; Manufacturing, Marketing; Transportation, or Distribution & Logistics CTE career cluster • The following English electives: public speaking, debate, advanced broadcast journalism, including newspaper and yearbook • Technology applications • A combination of credits from the categories listed above
Public Services	A coherent sequence or series of courses selected from one of the following: • CTE courses with a final course from the Education & Training; Government & Public Administration; Health Science, Human Services; or Law, Public Safety, Corrections, and Security career cluster • Junior Reserve Officer Training Corps

Table 2, Cont.

Arts and Humanities	A coherent sequence or series of courses selected from one of the following: • Social studies • The same language in Languages Other Than English • Two levels in each of two language in Languages Other Than English • American Sign Language (ASL) • Courses from one or two categories (art, dance, music, and theater) in fine arts • English electives that are not part of Business and Industry
Multidisciplinary Studies	A coherent sequence or series of courses selected from one of the following: • Four advanced courses that prepare a student to enter the workforce successfully or postsecondary education without remediation from within one endorsement area or among endorsement areas that are not in a coherent sequence • Four credits in each of the four foundation subject areas to include English IV and chemistry and/or physics • Four credits in Advanced Placement (AP), International Baccalaureate (IB), or dual credit selected from English, mathematics, science, social studies, economics, languages other than English, or fine arts
Total Credits w/Endorsement—26	
Distinguished Level of Achievement	• A total of four credits in math, including credit in Algebra II • A total of four credits in science • Completion of curriculum requirements for at least one endorsement
Performance Acknowledgments	For outstanding performance • in a dual-credit course • in bilingualism and biliteracy • on an AP test or IB exam • on the PSAT, the ACT-Plan, the SAT, or the ACT For earning a nationally or internationally recognized business or industry certification or license

Texas Education Agency (n.d. an)

A student can also earn a distinguished level of achievement designation with any endorsement by completing the required courses and passing an Algebra II course as one of two required advanced math courses, as well as achieving a performance acknowledgement. The STEM endorsement is the only endorsement that requires Algebra II be one of the advanced math courses for the endorsement, meaning that students earning the STEM endorsement automatically earn the course credits required for the distinguished level of achievement designation. The requirement or nonrequirement of the Algebra II course credit is particularly

important to consider when studying student graduation plans as Algebra II is required or highly recommended for admission to every four-year university in Texas (Ahmed, 2014). Another reason to pay close attention to the requirement, or lack thereof, for credit in an Algebra II course is due to House Bill 588 (HB 588), which was passed by the Texas Legislature in 1997 and is often referred to as "The Top 10% Rule." The Texas Legislature passed the bill that put the Top 10% Rule in place with an expressed intent to promote ethnic diversity at Texas colleges and universities ("Tribpedia," n.d.). HB 588 guarantees Texas students graduating in the top 10 percent of their high school class automatic admission to all state-funded universities, but to be eligible for admission to a university under the Top 10% Rule students must have earned an Algebra II course credit in high school. This means any student graduating on the Foundation Plan or the four endorsements other than in the STEM endorsement who do not go above and beyond the requirements of their career endorsement to earn the distinguished level of achievement designation are rendered ineligible or at best noncompetitive for admission to four-year public universities in Texas through the general application process and are excluded from admission under the Top 10% Rule as well.

Mark Strama, a member of the Texas House of Representatives representing a district in the Austin area, proposed an amendment to the bill before it was passed that would have made the distinguished level of achievement, which matched the course requirements of the previous 4x4 Recommended plan, the default plan for all students so that they would get the course requirements needed to graduate under the Top 10% Rule (Smith, 2013). The amendment allowed students to drop down to an endorsement, but started them all off under the Distinguished plan. According to Smith at the Texas Tribune (2013), Strama said, "Schools should assume that students are capable of completing high-level coursework and allow them to

opt out of it — not the other way around" (p. 1). The amendment failed to pass in the House with a vote of 97–50. Smith (2013) reported that the vote further prompted debate around "whether state high school graduation standards should prepare all students to continue on to college or provide more flexibility" (p. 3), which implies the legislators saw their choices as either increasing flexibility or preparing all kids to go to college, but that they could not do both. In the end, The Texas Tribune (2014) summarized the version of HB 5 that was signed into law as having reduced standardized testing requirements and rendered Algebra II optional rather than a requirement for graduation, but that lawmakers stress that "the new rules are intended to channel students toward a greater variety of post-high school training choices and, ultimately, stable careers" (p. 1). This is a clear statement that the priority was flexibility over college readiness for all students.

HB 5 requires students and their parents be counseled in how to effectively prepare for postsecondary education. It also requires students to be advised on the advantages of completing higher graduation plans such as endorsements and distinguished designation. Students must complete a personal graduation plan with guidance from school faculty or staff and choose an endorsement before or upon entering high school (TASA Summary, n.d.). In light of this mandate, it is interesting to note that the Texas Education Agency (TEA) currently does not dictate counselor-to-student ratios or even require that counselors be available in schools at any level of the K–12 system. The current number of counselors in Texas is very low ("State School Counseling Mandates and Legislation | American School Counselor Association (ASCA)," n.d.), creating very high student to counselor ratios. Hamilton (2010) reports

> The American School Counselor Association recommends a ratio of 250 students to every 1 guidance counselor. The Texas Education Agency recommends 300-

> to-1. While it's by no means the worst in the country—that honor goes to California—Texas' ratio still busts both recommendations with an overall average of about 420-to-1. There are 136 districts in the state with no full-time counselor. (Paragraph 5)

The low number of counselors available to support students and parents in their choice-making is concerning and creates considerable uncertainty about schools' ability to meet the requirements of HB 5 for counseling for students and their families. Students and parents have to make imperative choices about their program of study in high school and need information to make rational choices. It is the disadvantaged and minority students most in need of the assistance of a counselor to benefit most in their preparation for college who have the highest likelihood of limited access to counselors (McKillip, Rawls, & Barry, 2012, Lee & Ekstrom, 1987; Lee & Bryk, 1988).

Presumably due to concerns over the low numbers of counselors available, the Texas Legislature passed House Bill 18 (HB 18) in May 2015 introducing OnCourse, a program intended to increase the number of advisors available to students led by The University of Texas at Austin ("TEXAS ONCOURSE – a statewide public school initiative in Texas," n.d.). The program's website states that it is

> designed to support streamlined student pathways to postsecondary and career success across the state of Texas, through the use of best in class online content modules for secondary counselors, advisers and students, technology-enabled advising tools, and robust professional advisory and support networks. (Paragraph 2)

The OnCourse website provides a timeline for implementation of multiple strategies, including pilot-testing online courses with counselors, advisors, and middle school students and families in

fall 2016 and releasing professional development modules that will "enable educators to develop the knowledge and skills necessary to advise students appropriately about high school, college, and career readiness, and to fulfill additional advising responsibilities associated with HB 5" ("TEXAS ONCOURSE – a statewide public school initiative in Texas," n.d., para. 3) in spring 2017. While the state is clearly making efforts to increase the availability of training for more educators to enable them counsel students effectively, whether adequate and effective counseling is currently or will be available to all students in the future is unclear. Additionally, Lee and Ekstrom (1987) warned against assuming that access to advising means access to the information and advice that helps with college preparation. Their research showed that even trained counselors filter information based on biased interpretations of student abilities and aspirations, so access to advisors does not guarantee students equitable access to college preparatory guidance counseling.

Supporters of HB 5 touted the method of increasing student choice about course of study or graduation plan in high school as a way to increase student engagement, arguing that through more tailored programs students can better prepare for their postsecondary aspirations. A nonprofit advocacy group called Raise Your Hand Texas said, "The engagement piece of HB 5 is crucial, and students, along with their parents, are now making informed choices about courses relevant to their interests, aspirations, and plans for college or career" ("House Bill 5 Empowers Students," n.d.). This new set of graduation plans that allows students to choose a course of study more closely connected to their career aspirations was more attractive to stakeholders and policymakers than the previous more prescriptive graduations plans that were seen as one-size-fits-all plans.

Though some Texans see the choices in HB 5 as a tool to increase student agency ("House Bill 5 Empowers Students," n.d.), others have concerns about the impact of introducing so many pathways for students to choose, especially when so many of those choices are lower track options that limit postsecondary opportunities for students by leaving gaps between graduation course requirements and the requirements for admissions to four-year universities. The opponents of HB 5 and its graduation plans see the bill as a reintroduction of tracking into the state's system (Board, 2013). As referenced previously, research indicates that students of lower socioeconomic status and minority students are more often placed in lower tracks that create gaps in student learning and credentials earned in the K–12 system and therefore restrict those students' postsecondary opportunities. This research supports grave concerns that for poor and minority students in Texas schools choosing career endorsements though HB 5, the result will parallel the outcomes of tracking systems and achievement gaps between races and classes will widen in comparison to the outcomes of previous policies. Anderson and Oakes (2014) expressed concerns specifically about HB 5 introducing a tiered diploma system that funnels some freshmen into a high-track and distinguished diploma, others into a low-track foundational diploma, and still others into average tracks and career endorsements in between. In reference to HB 5 in Texas and other similar new laws in other states, they said, "It remains to be seen what these resurgent practices and new systems will yield, decades of research indicate the strong potential for such approaches to further imperil equality and opportunity" (p. 112). In light of the research around the influence schools have on student choice of tracks and the limited means for students and their parents to gain information about their choices, there are also concerns that Texas students never actually experience true informed choice about their educational options while in high school.

Examining this situation through the lens of C. Wright Mills's Power Elite Theory (1956), which says structures put into place by elite citizens in power are intended to provide them the means to stay in power, the advantages gained through tracking structures are unmistakable. There is strong evidence to show that tracking is a structure that segregates students by race and socioeconomic status. These structures offer exclusive access to higher level schooling to the wealthy and White students and provide the preparation to more advantageous postsecondary options (Gamoran, 1987; Lee & Bryk, 1988; Oakes, 2005; Rubin, 2008; Kelly, 2009; Anderson & Oakes, 2014). Rubin (2008) noted, "Classroom based research can reveal links between micro and macro levels of social relations, lending insight into how uneven educational opportunities for students are produced both among and within schools, despite attempts at equity geared reform" (p. 17). The inequitable structures at the micro level in each school produce stratified opportunities and options, and on a macro level they allow for the elite class to reify their place in society by creating structures that maintain the status quo. The theory of path dependence—organizations build momentum on their existing paths and so follow patterns established by their history—tells us new structures in schools are not likely to disrupt this deliberate stratification (Mahoney, 2000). Instead, whether based in informed student choice or placement by schools, these new structures are bound to reify the hierarchical nature of outcomes for students if explicit efforts are not made to break the pattern.

Study: HB 5 and Connections to Tracking

While modern tracking policies are implemented across the nation that all are worthy of study, the Texas context presents a unique opportunity for research on these evolving policies. HB 5 established a new set of graduation plans, the FHSP, that plainly incorporate multiple hierarchical levels of instructional pathways for students in Texas. The question at hand is

whether these plans are implemented in ways that should be considered tracking due to disparate outcomes that mirror those found in previous research on tracking structures. Many studies have shown that tracking, whether track assignments are made by student choice or school officials, reinforces social stratification in secondary schools based on race and socioeconomic status of students. This study was designed to help understand whether the HB 5 graduation plans result in inequitable student outcomes, echoing the results of previous tracking studies. By doing so, it contributes to understanding the social impact of the HB 5 graduation plans on student groups by the racial and socioeconomic distribution of the student population in districts as well as the types of districts across Texas.

As HB 5 only requires each district to offer one endorsement to students, this study first investigated the offerings provided to students in Texas high schools across the state leveraging the district as the unit of study. Then the study considered the outcomes by mean number of enrollees and graduates in each plan/endorsement put in place by HB 5 disaggregated to look at the subpopulations of each district as well as enrollees and graduates earning the distinguished level of achievement under FHSP. The data about offerings and outcomes were examined to find any significant differences between districts based on the type of district, or urbanicity of district, as well as racial and economic makeup of the student body in the district. The study answered the following questions:

1. Are there patterns in the endorsement plans Texas school districts offer based on the type of community the district serves (including urban, suburban, and rural) or the racial and socioeconomic distribution of the student population served by the district?
2. Are there patterns in the students enrolling and completing different HB 5 graduation plans and specifically differences between those that render students eligible for admission to a

university upon graduation versus those that do not, based on the type of community the district serves (including urban, suburban, and rural) or racial or socioeconomic composition of the student population at the district?

Scholarship about tracking structures indicates that social stratification is reinforced through the grouping, labeling, and sorting of students into low, average, and high instructional tracks. Students in the low tracks, who are disproportionately students of color and economic disadvantage, fare worse than their peers with the same ability levels who are placed in high tracks. Student choice about track placement is overshadowed, and student aspirations are undermined by these institutional arrangements that reify the disparities between student groups. Texas has adopted a policy that mirrors tracking structures and therefore has the potential to become a powerful force for segregation and stratification for students. This project investigated the offerings and outcomes of the new graduation plan structures in Texas under HB 5 that mirror tracking structures to examine the consequences it has on students from different places and with different backgrounds. This is a study of the first available data about HB 5 graduation plans and serves to inform policy discussion around graduation plans in Texas and in other states planning to implement similar plans with modern strategies for tracking placements that leverage student choice.

Personal Connection

My immediate family was connected to the military when I was a child. We moved around the country multiple times before settling down in San Antonio, Texas, while I was in middle school. My parents chose a house in a particular neighborhood in a suburb of San Antonio based on the local high school's extensive choices of advanced placement courses. After graduating from high school, I had the privilege of continuing my education at a Texas

university, earning a bachelor's degree in mathematics and a master's degree in mathematics education. Due to my family's position of privilege, I understood from a young age that I would have my choice of careers and that all I had to do was work hard and the opportunities presented to me after high school graduation would be limitless. In fact, I considered completing a bachelor's degree at a university an expectation rather than an option. My parents and teachers would not have had it any other way, and I never even realized that other students did not experience the high expectations and perceived boundless postsecondary opportunity that I did. This is a privilege I was given. Certainly I have worked hard at my achievements, but I was also provided with a foundation that made my hard work take me further than others who were not provided with similar opportunities.

I worked as a high school math teacher in a very diverse school in the Austin area for approximately six years. During that time, I witnessed extreme variation in the expectations for what my students could and would achieve from the educators in the system. My colleagues primarily consisted of teachers and leaders in the school who believed in and expected all students to learn. They worked to provide each and every student the opportunity to succeed. Distressingly, there were also many educators in the school who did not believe all students could learn. They dispensed clearly different and limited opportunities for success for those students whom they did not consider to have equal potential. Each and every one of those educators would have described their choices as being of benefit to the student—purposely giving the students low-level work and not pushing them to do work that is out of their range of ability, all in effort to ensure "success" and provide no possibility of damaging the students' self-esteem through failure. What the educators did not see is that the students understood their opportunities were being limited due to low expectations on their teachers' part, which resulted

in even more damage to their self-worth and setting them in mindsets that they were not capable of the more advanced work.

During those years, I came to understand the privilege I had experienced through the high expectations from my family and teachers that bolstered me in my educational and professional endeavors. I developed a determination to become a leader in the education system, continuously working ensure that all students experienced high expectations and knew they would have sufficient preparation to choose what they would do in their postsecondary endeavors. I became the department chair at that school and served an instructional coach for the district, working to change the culture that allows low expectations and low-level instruction for some while others are provided with advantages. Eventually, I was named the coordinator of mathematics for another diverse and fast-growing district in the Austin area. Each of these roles allowed me to impact a greater number of educators and thereby students. I currently lead K–12 system services work for the Charles A. Dana Center, one of the largest organized research units at The University of Texas at Austin. The Center's mission is to ensure all students experience and succeed in an excellent math and science education that puts them on a pathway to upward social and economic mobility. In our work, we collaborate with educators and policymakers in districts and states across the country on research-based, system-focused structures, processes, and tools that help achieve high expectations and opportunities for all students learning mathematics and science.

State and national policies and structures impact all students and their possibilities for achievement. I have spent my career seeking to increase the opportunities for all students to have first-rate learning opportunities in the K–12 system, with the intent of providing them greater choice and prospects for their postsecondary endeavors. HB 5 has the potential to limit what

students achieve, both within the K–12 system and therefore in their college and career options after leaving the public school system. By increasing student choice of graduation plans in secondary schools to include many low-track choices and not intentionally addressing the issues of segregation and inequities that result from tracking, I worry that the impact of this bill results in the reification of social stratification and limits many poor and minority students' postsecondary choices.

Chapter Summary

In this chapter, I provided an overview of the research that shows issues of segregation and stratification in schools when tracking structures, including those with placements based on student choice, are in place. I established that the graduation plans under Texas's 2013 adoption of HB 5 mirror tracking structures and described the study performed that examines the offerings and outcomes of HB 5 to find if the outcomes of these new structures produce the same disparate outcomes from previous studies on tracking. Finally, I highlighted the implications for policies like HB 5 and my personal interest in the subject of HB 5. In Chapter 2, I provide a review of the pertinent literature, extending the ideas of stratification in tracking structures to explore what happens in schools that purposely attend to detracking and how student choice in track placement impacts the outcomes of tracking. I also introduce the theoretical frame for the study, Mill's Power Elite Theory. In Chapter 3, I discuss the methods for the study.

CHAPTER 2

Literature Review

Four strands of literature inform this research study. The first strand, (a) the impacts of tracking, was discussed in Chapter 1 to support the establishment of the issue around the implementation of HB 5 graduation plans. The remaining strands are (b) tracking structures in contemporary schools, (c) detracking schools, and (d) student choice in placement decisions: code for tracking. I review these strands of research because they inform this study around the implementation of hierarchical FHSP graduation plans. As the structures of HB 5 mirror tracking structures, though a more contemporary tracking configuration, we might anticipate that the outcomes of HB 5 are likely to also be mirrored after the implementation of these graduation plans. Considering that the expressed intent for HB 5 was to better serve students and allow them choices in their education to better customize their educational experiences in preparation for their specific aspirations, research about detracking schools and how student choice as the primary decision on student placement into tracks is also presented.

My review of the literature analyzed studies published primarily between 2000 and 2016 to gain an understanding of the most recent work in this body of research. However, I also included several seminal pieces on the impact of tracking dating back to the 1980s when tracking practices were openly and regularly implemented in schools and were studied deeply by many researchers. These searches returned hundreds of articles, and I narrowed to only those specifically about the impacts of tracking, tracking structures and how they have evolved, detracking schools, and use of student choice in placement in tracking structures or in decisions about course of study in American secondary schools. I also reviewed additional articles that were referenced in pieces I was already reading that were germane to this study, adding them to

the resources referenced when appropriate. Three strands are presented here: tracking structures in contemporary schools, detracking schools, and student choice in placement decisions: code for tracking.

Tracking Structures in Contemporary Schools

Tracking takes on many different forms in schools. Some have stricter course program tracks, while others employ tracking through individual courses or even within classes. More traditional practice of tracking separates students into distinctly separate programs of study based on their ability or achievement, but there can also be tracking within programs and classes where teachers assign different work and provide moderated instruction to small groups of students based on their abilities or talents ("Research Spotlight on Academic Ability Grouping," n.d.). An example of tracking assignments that divide students into entirely different programs as cohorts might look like a three-tiered system—academic track, vocational track, and general studies track (Oakes, 2005). More often, tracking structures allow for some shared courses comprised of students with mixed abilities, while other courses maintain segregation by ability, talent, or interests (Oakes, 2005; Rubin, 2008). While tracking structures vary in today's schools, the common themes in tracking are dividing students into separate groups and then providing those groups disparate levels of instruction.

The placement process into groups or tracks also manifests in varied forms (LeTendre, Hofer, & Shimizu, 2003). Tracking placement is often achieved through automatic assignment to courses based on test scores or previous achievement in educational settings, using these measures as methods of locally defined ability of students (Rubin, 2008). Some placements are openly discussed, and students are well aware of the reasons for their assignment. Other placements are done in ways intended to be covert and unknown to students. In these cases,

while they might not understand what initiated the grouping, students usually understand that they have been grouped and are receiving different treatments (Rubin, 2008). More frequently though, school systems are saying they put placement decisions in students' hands, allowing each student to select their track or course of study based on interests or future ambitions (Oakes, 2005; Rubin, 2008). Diverse approaches are used to place students in tracks, but they share the common characteristic of disparities in placement patterns. Regardless of placement approach, minority and poor students are placed in lower tracks at a much higher rate than White and wealthy students. Lee and Bryk (1988) conducted seminal work in this area, finding that there is a direct effect of social class and minority status on tracking placements, with poor and minority students overrepresented in lower tracks. Rubin (2008) conducted a more recent study and found that minority students, including African American and Latino students, as well as low-income children of all ethnicities continue to be overrepresented in low tracks and vocational programs.

Tracking structures are put into place with the intent to ease the difficult and complex job of teaching, working under the assumption that groups of students with similar characteristics learn in similar ways and learn more easily from each other (Ansalone, 2010). This way of thinking also assumes that homogeneous ability or interest groups allow teachers the targeted efficiency of teaching students with similar ability levels or interests rather than trying to reach students with a wide range of abilities in the same classroom (Oakes, 2005). However, research shows that the way tracking plays out in schools is that segregated groups of students are provided with strikingly different curriculum, pedagogy, expectations, and goals (Rubin, 2008). To provide tailored instruction for groups of students, teachers have to consider and understand the needs and goals of their students. The public labeling and characterization of students through tracking structures in schools influence understandings of the needs, priorities, and

characteristics of communities and students (Oakes, 2005; Rubin, 2008). Rather than getting truly tailored instruction, the assigned track level decides the types of instruction provided to students based on traditions in the institution of schools. According to Rubin (2008), teachers of lower level courses typically provide students with "little to no opportunity to display anything other than compliance and mastery of rote, low level skills" (p. 5). Teachers do not expect students to be able to accomplish as much as those students on higher tracks due of their placement (Ansalone, 2010); therefore, students are not even given the chance to experience activities in which they would apply or develop those skills. Oakes (2005) also found that lower level track courses also provide less time in class devoted to instruction and more time off task and devoted to behavioral issues. Just being assigned to a lower track results in lower level instruction and less opportunity to develop deeper thinking skills.

On the other hand, the instructional strategies provided to students at higher levels are quite the opposite, typically including "broad-based, integrative instruction, concept based, open ended questions that stimulate inquiry, active exploration, and discovery" (Rubin, 2008). Though commonly reserved for classes for student on higher tracks, these strategies have been shown to work well and benefit all students at all ability levels (Oakes, 2005; Rubin, 2008). The influence of the labels in tracking systems, constructed through the institution of school that describes students' ability levels or perceived talents and aspirations, shapes teaching practices and instructional approaches and results in disparate opportunities for students (Oakes, 2005; Rubin, 2008).

Students are often placed into tracks based on measured ability levels as defined by local contexts that may not be accurate (Ansalone, 2010). Then students are exposed to very different learning experiences while on those tracks, not only maintaining any differences in achievement

but also widening them. Anderson and Oakes (2014) found "tracking practices often … create differences and perpetuate inequalities" rather than creating efficiencies and effectual structures for teaching and learning as intended. Instead of receiving tailored instruction that results in better outcomes for students when they are grouped in homogeneous ability groups, students are provided with disparate experiences that expand learning gaps and therefore compound differences in ability (Gamoran & Mare, 1989). This practice demoralizes and discourages students, more often poor and of color, who end up in the lowest tracks (Rubin, 2008). The disparities in curriculum, instruction, and even social interactions in the classroom within tracking structures are to the detriment of students in the lower tracks (Kao & Thompson, 2003; Anderson & Oakes, 2014).

Detracking Schools

As scholars in this area call for the end of tracking, there have been efforts to "detrack" school systems and implement heterogeneous ability grouping structures (Rubin & Noguera, 2004). These efforts have proven to be arduous and complex, introducing dilemmas around both academic and social aspects of schooling. These challenges are so great so that some districts trying to detrack have abandoned their efforts soon after starting their implementation of the new mixed-ability-based structures (Rubin & Noguera, 2004).

Academic hurdles in detracking efforts center primarily around implementing effective, differentiated instruction for students with wide-ranging levels of academic skills. Rubin and Noguera (2004) found that some teachers without proper training and resources try to reach more students by "teaching to the middle" or use materials and instructional strategies that meet the needs of students in the middle skills range, rather than addressing specific needs of all students. This approach can frustrate struggling learners and bore those who are not challenged in these

settings. Rubin and Noguera also found that some teachers effectively "retrack" within their classrooms by providing more challenging and robust curriculum to high-achieving students and weaker curriculum and instructional strategies for lower performing students. This approach misses the intent of detracking—increasing expectations and opportunities for all students. While these are real struggles, especially at large scale, systems have been able to overcome these academic challenges of detracking using strategies that focus on maintaining high expectations for all students and scaffolding instruction or providing additional support structures for students who need them to successfully reach those goals (Rubin & Noguera, 2004).

Social aspects of detracking in schools also pose significant difficulties and require specific attention. Rubin and Noguera (2004) found that students in detracked systems tend to self-segregate in classrooms. Lower achieving groups tend "to volunteer less, [and] spend more time on non-academic pursuits, such as talking, note-passing, eating, and putting on make-up" (p. 94), earning more negative attention and reprimands from teachers. They found that teachers who pay close attention to the grouping and seating assignments in class—intentionally pairing and combining students based on the classroom activities—improve participation and increase positive attention.

Through research on these structures, we have learned about the strategies employed by schools that have effectively moved to heterogeneous ability groupings from homogeneous structures, or detracked, their schools. These schools have attended to

> modifying school structures and providing resources to support the detracking efforts and the students and teachers involved in them, altering classroom curriculum and instruction to those most appropriate for heterogeneous settings, and integrating practices that facilitated a transformation of students' and

teachers' belief systems about learning and ability. (Rubin, 2008, p. 3)

Specifically, Rubin (2008) noted that keeping the structures from tracking in place and just opening tracks to allow student choice for placement in those tracks is not enough to create a real difference in the disparities between student groups. She noted that curriculum and instructional resources that support the effective teaching strategies for heterogeneous groups must be employed, and explicit efforts to impact student and teacher mindsets around ability groupings must be part of the transition for detracking efforts to be effective (Cooper, 1996).

Following that thinking, Oakes, Wells, Jones, and Datnow (1997) posited that changes to the technical dimensions of schooling such as curriculum and instruction are not sufficient and that the normative and political dimensions of schools must be challenged for detracking to be effective. Often, efforts to detrack school systems have met with opposition, generated controversy, and in some areas even experienced concerted resistance from varied stakeholders. Rubin (2008) found that those most likely to resist changes from homogeneous to heterogeneous ability groupings are the parents of children who formerly had the advantage of placement in the higher tracks and want to maintain that advantage. These parents worry that efforts to detrack lead to reduced academic standards and achievement for their children. However, there is evidence that when done well moving to heterogeneous groupings in schools has the potential to dramatically increase student performance across the board and the quality of all students' educational experiences (Cooper, 1996; Rubin & Noguera, 2003; Burris & Welner, 2005; Rubin, 2008).

Detracking efforts aim to ensure that all students have access to the high-quality learning experiences and effective teaching strategies that heretofore have been reserved for students in high tracks. Anderson and Oakes (2014) pointed out that Finland, a country often acclaimed for

high educational achievement and small achievement gaps between social groups of students, is dedicated to the employment of heterogeneous groupings. Rubin and Noguera (2004) argued that detracking is part of needed comprehensive reforms that aim to more equitably distribute resources and opportunities in our school systems.

Student Choice in Placement Decisions: Code for Tracking

As student choice about their own course of study in secondary school plays an increasing role in tracking placements in schools across the country (Oakes, 2005), consideration should be given to literature around outcomes of tracking placements for different groups of students as well as the aspirations of students in different groups upon entering secondary school. Farmer-Hinton (2008) cited several studies that show poor students and students of color are similar to their White and affluent peers when starting high school in their desires to attend college upon graduation from the K–12 system. There are little to no differences in the aspirations of students in different groups as they enter secondary school. However, despite the similarities in the initial ambitions of all students, there are disparities in secondary schools between student groups based on race and class in their college planning and preparation in addition to disparities in their placement in programs of study or tracks (Farmer-Hinton, 2008). These disparities are even more pronounced for students of color whose parents have not attended college. While these parents strongly encourage their students to go to college, they have difficulty offering specific advice for students with college plans. Affluent students plan for college much earlier and more intensely than students of color from poor backgrounds, and they are able to do so because of their parents' experiences, networks, and other resources (Farmer-Hinton, 2008). Though the aspirations of the different student groups are similar for college-going, the support provided them and the achievement of those aspirations is inherently unequal.

This reinforces disconcerting patterns in American culture that allow social constructions of race, class, and ability to impact the opportunity and outcomes students have in schools and the elite to maintain their social status (Anderson & Oakes, 2014).

It should not be surprising that research shows when students are given choice about tracking and course-taking, those choices are not made purely based on their aspirations, interests, and motivation. Instead, the institution of school influences student course-taking patterns (Lee & Bryk, 1988) by informing the choices students make (Oakes, 2005) through means such as counseling and teacher recommendations. Lee and Ekstrom (1987) found that counselors control student access to the college preparatory curriculum; in so doing, they act as critical barriers between students' efforts and their attainment rather than facilitators of opportunity for those students. Lee and Ekstrom also showed that counselor decisions on program placement and planning were related to students' race and class. Minority and lower social class students are less likely to be in honors-level courses, even when they have significant previous academic achievements (p. 289).

Guidance counselors are charged with assessing student and parent aspirations about postsecondary endeavors and their abilities and then providing information on programs and advice that supports student success in those endeavors. Based on the counselor's interpretation of students' aspirations, he or she is likely to filter the types of information shared with students (Corwin, Venegas, Oliverez, & Colyar, 2004). Counselors' interpretations of abilities are found to be biased; therefore, they cause failure to dispense appropriate information, with especially large disproportionate effects for those students who would be first-generation college-going in their family (Corwin et al., 2004). Fallon (1997) said that "because many of these students have not been seen as college material, they have not been encouraged by school counselors, teachers,

or administrators to take part in the courses and guidance activities that will help them successfully compete for college admission" (p. 387). Counselors have the potential to help students gain clarity and take actions that bolster college-going plans, but often they end up playing the role of gatekeeper instead.

For students who have no access through their social circles to adults who can provide specific advice around planning for postsecondary options, the lack of information is even more serious. Lee and Bryk (1988) attributed exacerbation of social differences and their effect on student course-taking in secondary school to the fact that information about the consequences of those choices is not accessible in the same ways for all students. They also showed that when a system offers too many choices to students, particularly in nonacademic curricular areas such as vocational tracks, the system is actually providing incentives for students to choose programs of study that may ultimately, and in ways unbeknownst to them at the time, significantly limit their postsecondary opportunities. Just as less-educated parents struggle to help their children with planning for college, they are also challenged with advising their children about high school course choices that effectively prepare them for postsecondary endeavors. Social class differences affect the familiarity parents have of school structures and multilevel tracking as well as their understanding of the profound importance of track placement on students' future educational endeavors (Rosenbaum, 1980; Kelly, 2009). The lack of information and understanding on the part of the poor and minority population, both in students and parents, means they are less likely than their White and wealthy classmates to demand placement in higher tracks.

Counselors also consider records of previous academic performance and programs when providing students with guidance on choosing tracks. Lee and Bryk (1988) posited that as

children from lower socioeconomic status are more likely to already be disadvantaged academically when they enter high school, they are less likely to engage in more academic pursuits while in high school. Kelly (2009) found similar results in his more recent study, "The Black–White Gap in Mathematics," in that Black high school students typically have lower socioeconomic status and academic achievement as well as inferior prior course-taking, so they are more likely than their White peers to be enrolled in low-track mathematics courses. These studies show that the dissimilarities of students that exist when they start school are intensified through tracking rather than mitigated, implying that students experience a type of path dependence. Compounding inferior educational experiences impact track assignments in secondary schools and hence continue to increase stratification between student groups.

Student ability levels, previous achievement, and "informed" choice based on postsecondary aspirations all play roles in the ways students are grouped and separated in school tracking systems across America. Anderson and Oakes (2014) stated, "While specifics can vary from school to school [in tracking placement processes], ultimately nearly all grouping assignments are made and justified by schools predictions about students' capacity to succeed" (p. 109). Schools construct the characteristics by which they sort students into tracked instructional programs and then provide disparate experiences that produce unequal outcomes based on those characteristics. Whether students are making choices based on school recommendations or are directly assigned to a track, the research shows these structures reinforce disparities in opportunity and achievement and therefore social stratification.

Diverging Research Results on Tracking

While the majority of studies around tracking show negative effects for students assigned to lower tracks in areas of achievement and academic ambitions while having little to no impact

on students in higher tracks (Anderson & Oakes, 2014; Gamoran, 1987; LeTendre, Hofer, & Shimizu, 2003; Oakes, 2005; Rubin & Noguera, 2004; Rubin, 2008), some studies dispute these results or question the real source of the issues. Loveless (1999) published *Tracking Wars: State Reform Meets School Policy,* a book that investigates the differences in findings around tracking. Loveless states, "Few, if any, of the questions around tracking's effects are settled, and research is ambiguous on the policy direction that schools should pursue" (p. 15). These questions around the impact of tracking have also been explored by other researchers.

Argys, Rees, and Brewer (1996) conducted a study around the impact of tracking structures on achievement levels and published as an article called, "Detracking America's Schools: Equity at Zero Cost?" This article stated that detracking would substantially benefit students currently in low tracks, but negatively impact those students currently in higher tracks. Their model showed that when controlling for track assignments and classroom characteristics, the higher track student performance on standardized math tests decrease by nearly the same amount that they found lower track students' scores increase. They posited that these discrepancies in impact on achievement of students in different tracks leaves policymakers with a tough choice of maintaining tracking to ensure that "tomorrow's entrepreneurs and wealth creators" (p. 640) are not held back in their achievement or detracking to ensure longer term benefits that would come with increasing achievement of the historically underserved populations in our society.

There are also several studies that find the disparate outcomes between students in low and high tracks typically attributed to the tracking structures themselves are actually due to other related but not identical variables. For example, Hattie (2002) conducted a study on the effects of classroom composition and peer grouping, including tracking by ability grouping and other

classroom organizations, on student achievement. He found that the type and effectiveness of instruction and the culture in the different classrooms was much more impactful than the structure of tracking itself. He states

> Whether a school tracks by ability or not, reduces class sizes, implements multigrade/multi-age or single-level classes, or has coeducational or single-sex classes, appears less consequential than whether it attends to the nature and quality of instruction in the classroom, whatever the between-class variability in achievement. The learning environments within the classroom, and the mechanisms and processes of learning that they foster, are by far the more powerful. (p. 449)

These results indicate that tracking structures are not the cause of the inequitable outcomes and the reification of social stratification, but rather the differential treatments applied in tracked classrooms that are to blame.

In conclusion, continuing studies around tracking structures, their impacts on achievement and equity, and the variables that might be considered confounding with tracking should be conducted. This study adds to this body of work and serves as the foundation for future studies.

Theoretical Frame

The research previously summarized argues that social stratification is reinforced through tracking in schools. Mills (1956) posited a theory that an elite class exists in America who do not rise to the top just because they meet the demands of society, but who exercise great enough power to create the demands of society and insist everyone else to meet those demands. He stated that Americans in the elite class "occupy the strategic command posts of the social

structure, in which are now centered the effective means of the power and the wealth (…) which they enjoy" (p. 74). Mills' theory provides a lens through which to view the history of the American education system, which set out to provide a public good through a common educational experience. As referenced previously, the elite class gained access to special schooling that allowed them to create and maintain their edge in the job market. Based on their demands, the system now offers a very uncommon educational experience, with higher level instruction and opportunities available within the public system to the elite who created the structures. These structures benefit those in power through the immediate access to higher levels of education as well as the institutionalized structures that reinforce the stratification. Tracking is one of the structures contributing to the continued stratification, separating student populations into low, average, and high tracks of instruction in ways that segregate poor from wealthy and minority from White.

The theory of path dependence posits that historical sequences set institutional patterns into motion; these patterns have deterministic properties that are self-reinforcing, as the practices gain inertia and continue to move the institution toward the originally designed outcomes (Mahoney, 2000). Tracking is a structure that follows a historical pattern in the institution of schooling of providing access to education for all as a public good, while simultaneously providing exclusive access and advantage for the elite as a private good to them. Intentional stratification began in the education system with the introduction of secondary schools in the early 1900s (Labaree, 2011), and structures that bolster dissimilar outcomes based in race and wealth have gained momentum. Whether current tracking systems intend to provide students choice in their placements, the decisions of the past have created a path dependency on the structures that stratify, which overwhelm and overshadow the individual agency needed to break out of those

patterns. The elite demanded a system that endorsed their privilege, and path dependency maintains the impetus for selectively distributing education credits as a commodity to those with the privilege.

This study examined the data around the offerings and outcomes of the HB 5 graduation plans in its first years of implementation. It objectively examined the data to find if the HB 5 graduation plans, using student choice as the primary placement tool, produce inequities in the same ways that the research shows other multitiered graduation plans have in the past. Considering the previous studies showing that multitiered graduation plans reinforce social stratification, the hypothesis of this study was that a disproportionately high number of minority and poor students are offered, placed in, and graduate on plans from lower tracks, while White and wealthy students make up a greater proportion of the higher tracks under HB 5. This system-supported imbalance would continue to provide advantage for those currently in power and disadvantage those who are not, following the conjectures of Mills' theory about the power elite and the theory of path dependence.

Policy Implications

As many states and districts implement tracking in secondary schools through both formal and informal means, the implications are wide ranging. Policymakers in Texas and other states should recognize the disparities that tracking structures create in offerings and outcomes of secondary schools and therefore that they limit the opportunities in postsecondary endeavors for minority and poor students. Public education policies that seek to sort and label students, provide unequal educational experiences, and result in disparate outcomes for students have become the norm for American secondary schools because the elite class has created and maintained these structures. These policies are put in place despite research indicating that these programs

increase or preserve advantage for the elites in society and simultaneously hurt those who are not of privilege. Policymakers should institute structures that employ heterogeneous grouping of students, which benefits everyone, rather than stratifying classes in schools and benefitting only the higher tracks. They should create a wider range of opportunities for all students as they leave the K–12 system. As policymakers explore options for change, they should remember the warnings of Rubin (2008) that successful detracking incorporates change on a variety of levels, including the modification of school structures to provide access to all levels of instructional programs, resources designed for heterogeneous groups for students and teachers so instructional practices can change effectively, and support for the transformation of student and teacher belief systems about learning and ability. School leaders and teachers should support these changes in their schools to serve all students in order to allow them to reach their potential and achieve upward social and economic mobility rather than grouping students and continuing the patterns of outcomes including differentiated opportunities, resources, and expectations.

Chapter Summary

In this chapter, I discussed the existing research on contemporary tracking structures, detracking work, and the impact of student choice as placement into a tracking structure. I also discussed Mill's Power Elite Theory, attributing stratification in the school system to an intentional creation of those in power to reify the structures and maintain the advantages they currently experience. In Chapter 3, I will detail the methodology and research design as well as methods of this study, including a description of the research strategy and justification, methodological approach and research questions, data and variables, and limitations of the methodology.

CHAPTER 3

Methods

Introduction

This study is a quantitative analysis of administrative data collected about students and the school districts in which they are enrolled across Texas. I set out to investigate whether there are inequities produced by the implementation of the HB 5 FHSP graduation plans that mirror those found in previous studies of tracking structures. The data, all collected by and obtained from TEA, pertain to the offerings of endorsement choices at each district across the state as well as numbers of students enrolled in and graduating under each graduation plan in all districts across the state. In the analysis, the study pays specific attention to the difference in offerings and outcomes of graduation plans requiring a course of study that results in eligibility for university admission and those plans that do not. The purpose of the study was to investigate and understand whether the implementation of the HB 5 graduation plans are introducing and extending inequalities in the system around racial makeup and socioeconomic levels of students in the districts and the type of district. This chapter outlines the research strategy and justification, methodological approach to address the research questions, data and variables, and finally limitations of the methodology.

Research Strategy and Justification

My overarching research strategy was to examine the relationship between the offerings and outcomes of HB 5 graduation plans and district demographic data, including the racial and socioeconomic makeup of the district and its urbanicity. A quantitative analysis is the most appropriate approach for this initial study of HB 5 graduation plans because the numerical data collected and examined by districts and the state education agency are used by those entities for

policy and evaluation decisions. Statistical techniques allow quantification of the extent of the relationships between and within categories of interest. Possible extended studies that use various other approaches will be discussed in Chapter 6.

The study's design leveraged quantitative data to answer the questions about whether the HB 5 policy implementation is producing inequities in opportunities and outcomes for K–12 students that then limit their postsecondary endeavors through a pragmatic approach. Anastas (2012) said, "While philosophers of knowledge are often most concerned with truths, pragmatists in general are more concerned with determining which ideas are *useful* in achieving some social good" (p. 162). My sense of urgency for understanding the current state of implementation and creating change to right any inequities introduced demands that this study be beneficial to students and educators in the state. The state tracks data around which students are enrolled in high school under the FHSP plan or previous plans. It also asks districts to submit data about which endorsements students are enrolled in and graduating under. Studies using the state's own data should be relevant and useful tools in the discussions about the structures in place and whether they are helping or hurting students to reach their educational goals.

The project investigated the relationship between the district characteristics and the educational offerings and outcomes under the implementation of HB 5. It leveraged descriptive and inferential statistics, both aimed at revealing what is happening in districts under the FHSP graduation plans. The International Encyclopedia of the Social Sciences (2008) defines *descriptive statistics* as tools that summarize features of a data set to "help represent large data sets in a simple manner" (p. 311). The use of descriptive statistics showed features of the data that support comprehension of the current state of affairs across Texas. For example, a feature of the data set worth examining is the mean number of students graduating on plans that render

them eligible for university admissions in districts across the state. The descriptive statistics also gave context that helped in the iterative process of data analysis to adjust hypotheses for the study.

On the other hand, inferential statistics allowed the formation of generalizations about the data. These methods allowed inferences about whether differences in the number of students in diverse groups and districts graduating on different plans is natural variation or if there are statistical indications that the variation is correlated with the changes in other variables (e.g., racial composition or socioeconomic status of the student body of each district). As the Encyclopedia of Measurement and Statistics (2007) states, inferential statistics are employed to look at data and "yield likelihoods of responses that are then compared to what is expected for the population based on the properties of mathematical distributions" (p. 457). Together, the descriptive and inferential statistics build a strong case for understanding the activity in districts concerning the graduation plans introduced by HB 5 in 2013 and understanding the influences the district characteristics have on outcomes for students.

The literature review in Chapter 2 of this paper references studies that assessed tracking structures and their impacts on different groups of students, specifically looking at student achievement and outcomes in groups by race and socioeconomic status. I followed the lead of the researchers before me and also looked at student data disaggregated by racial groups and socioeconomic status. As Texas has a wide range of sizes and locations of districts, I also examined the variable of district type, or urbanicity, in my study.

TEA tracks enrollment and graduation data in the following categories when calculating percentages of students on each graduation plan that were leveraged in this study: All Students, White, African American/Black, Hispanic/Latino, Asian, Native Hawaiian or Pacific Islander,

American Indian or Native Alaskan, Two or More Races, and Economically Disadvantaged. For the primary purposes of the study, I focused on the offerings and outcomes for racial groups of African American/Black and Hispanic/Latino as traditionally underserved populations in education and compared to White as the traditionally disproportionately served. I also focused on the economically disadvantaged group in comparison with those who are not economically disadvantaged for the same reasons. While outside of the scope of the study, I also examined data around the student categories of Limited English Proficiency, Male, and Female as other interesting data points to examine.

TEA classifies districts into the following types: Major Urban, Major Suburban, Other Central City, Other Central City Suburban, Independent Town, Non-Metropolitan: Fast Growing, Non-Metropolitan: Stable, Rural, and Charters. I chose to condense these into only three categories for this study: Urban (Major Urban, Other Central City), Suburban (Major Suburban, Other Central City Suburban), and Rural (Independent Town, Non-Metropolitan: Fast Growing, Non-Metropolitan: Stable, Rural). In Texas between 2014 and 2017, there were approximately 52 urban districts, 241 suburban districts, and 680 rural districts using these definitions. This model follows the model of Dreier, Mollenkopf, and Swanstrom (2014), who in their studies of how place matters in politics and policy use classifications of Central Cities, Suburbs, and Rural Areas to organize their work. I did not include charter school districts or networks in this study, as charters are not subject to all of the same policies as public school districts and may bring variables that are inconsistent considered in a study around traditional public school districts, which might skew the data.

Methodological Approach and Research Questions

The study used descriptive statistics to discuss the offerings and outcomes of the HB 5

graduation plans across years since its implantation in 2014. For example, the count of districts with students enrolled or graduating from each graduation plan provides us with information about how fast the implementation is occurring across the state. For another example, observations of the smallest and largest proportions of students in districts, as well as the median proportion, who are graduating under the distinguished achievement plans and rendering them eligible for university admission are also interesting to consider. The descriptive statistics include summary measures about the data for the entire population. For example, I present the mean proportion of students graduating under the distinguished achievement designation in the districts across the state, shown both at the state level and by urbanicity. These observations contributed to building a strong understanding of the impacts of the HB 5 graduation plans and are provided in Chapter 4.

Inferential statistical analysis provides more than just observations about the data. *Inference* is analysis of relationships and patterns in the data and allows for those relationships to be measured. Regression models are used regularly in social sciences to approximate features of a relationship between a dependent variable and one or more predictors or independent variables, describing "the conditional mean of the outcome at specific values of the predictor" (International Encyclopedia of the Social Sciences, 2008, p. 136). Standard regression models measure a linear relationship between outcomes and predictors that are continuous variables. A generalized linear model (GLM), a more advanced statistical application, measures relationships between continuous linear predictor variables and categorical outcomes that follow an exponential family distribution but use a linking function to estimate means through linear combinations. (Introduction to Generalized Linear Modeling, n.d., p.2). A GLM assumes the outcome responses are independent as does the standard regression model, but homogeneity is

not assumed. The GLM uses maximum likelihood estimations where standard regression uses ordinary least squares to estimate parameters.

I employed a Poisson regression model to explore the relationships between racial and socioeconomic makeup of a district and the type of district as predictors of the number of endorsement offerings of each district,. A Poisson model is a specific type of GLM used when the outcome variable is a count (International Encyclopedia of the Social Sciences, 2008); it uses a log function as the linking between the categorical outcomes and linear predictors (Introduction to Generalized Linear Modeling, n.d., p.2). To model the relationship between those same predictors on enrollment in and graduation on FHSP plans as well as enrollment and graduation in the distinguished level of achievement, I utilized a logistic regression model. This GLM estimates relationships between continuous predictor variables and binary outcome variables (Regression Analysis, 2008; Logistic Regressions Analysis, 2007) and uses a logistic function to link the outcomes and linear predictors (Introduction to Generalized Linear Modeling, n.d., p.2). A logistic regression measures the log odds that a particular value will occur in the response variable based on the values of the explanatory or independent variables (Encyclopedia of Measurement and Statistics, 2007), which can then be converted into odds ratios and probabilities.

However, one assumption that must be met for a GLM to produce an accurate measurement of relationships is there must be statistical independence (Testing Assumptions of Linear Regression, n.d.) in the observations. This study explored relationships between race, socioeconomic status, English language learner population, and urbanicity and the outcomes of the implementation of FHSP graduation plans within and between districts over a three-year period. The observations from the same districts over multiple years may be considered to be

matched data and therefore would not meet the assumption of independence as is needed for a Poisson or logistic regression to provide good measure of these relationships.

Considering the context of the study, I investigated whether a multilevel model, or mixed-effects model (MEM), might be a more appropriate statistical approach. Multilevel modeling, an advanced application of regression techniques, measures influencing characteristics or predictors from multiple levels in a context (Luke, 2004). Luke states that "there has been increasing interest and activity in promoting a more multilevel approach in behavioral, health, and social sciences" (p. 2) and encourages the use of multilevel models in situations such as the education system. He says "The simplest argument, then, for multilevel modeling techniques is this: Because so much of what we study is multilevel in nature, we should use theories and analytic techniques that are also multilevel" (p. 3). Because this study is exploring a social context with multiple levels (looking at influencers of behavior both within and between districts over time), it is appropriate to test the use of an MEM for data analysis as it will allow for estimation of interdependent relationships and elucidate relationships within and across levels.

To address each research question, I fitted an MEM that tested for relationships between independent (or predictor) variables and dependent (or response) variables with both fixed effects within districts and random effects between districts over time. To begin, I fitted an unconditional means model that considered only the random variation between districts. The intraclass correlation for each null model was then assessed to determine the percent variance in the dependent variable that is accounted for by these groups (Luke, 2004). The intraclass correlation coefficient (ICC) for each unconditional means model suggested the use of the multilevel or mixed-effects approach was appropriate because the ICCs suggest that the variation in outcomes is partially explained by the differences between districts. Models also showed

positive coefficients of random-effect variance components, indicating there is potentially unmodeled variability in this base model without predictor variables and providing justification for moving forward with building an MEM to investigate the influence of other parameters. For each question, I built several models and used multiple indicators, or fit indexes, to determine what combination of variables produced a parsimonious model with the best fit for the data. I relied primarily on the Akaike Information Criterion (AIC) and Schwartz's Bayesian Information Criterion (BIC) to decide on the MEM that would best represent each relationship. Both provide an index that allows comparison of the fit of models, considering the statistical goodness of fit and the number of parameters, with a lower index indicating a better fitting model (Everitt, 2002a). When there were indications that the MEM was not an appropriate fit for the data, I instead employed single-level GLMs, Poisson or logistic as appropriate, to explore if relationships existed between variables of interest.

The parsimony principle says that when choosing a statistical model to represent data from a set of possible models, all of which adequately fit the data, the model with the fewest parameters is preferred (Everett, 2002b). This is accounted for in the calculations of the AIC and BIC indices, which both provide a penalty that raises the index score when more parameters are included in a model. To maintain parsimony in the models, I used as few predictor variables as possible, excluding those variables that did not increase fit of the models or show statistical significance as an influencer of the response variable of the model. To accurately and appropriately interpret the results in a multilevel context, I centered the continuous predictor variables about their grand-means. Thus, interpretations of the fitted models are compared to the average value of that predictor variable, rather than comparing to when that variable has a value of zero. The exception is for the variable representing the year, which was not centered so

comparisons will be made to Year 0, or 2014–2015, in the study. Details about each model, fit indexes for each model, and significance levels for each variable and their fixed and random effects are discussed in Chapter 5.

Research Questions and Hypotheses

As stated in previous chapters, this study seeks to answer the following questions:

1. Are there patterns in the endorsement plans Texas school districts offer based on the type of community the district serves (including urban, suburban, and rural) or the racial and socioeconomic distribution of the student population served by the district?
2. Are there patterns in the students enrolling and completing different HB 5 graduation plans and specifically differences between those that render students eligible for admission to a university upon graduation versus those that do not, based on the type of community the district serves (including urban, suburban, and rural) or racial or socioeconomic composition of the student population at the district?

The graduation plans implemented under HB 5 are a hierarchical, multilevel set of pathways for students to choose between. In this set of endorsements, more plan options render students ineligible or noncompetitive for university admission than plans that offer access to university-level studies. The scholarship around tracking structures, specifically including the literature around structures offering many low-track options and those using student choice as the primary assignment tool, show that these structures create segregation and inequities, having negative impacts on students in the lower tracks. The statistical tests that I applied considered the null hypothesis that none of the predictor variables of race, socioeconomics, and type of district have a statistically significant impact on the values of the response variables of offerings and outcomes of the HB 5 graduation plans. When there is no evidence of inequities shown in the

data around the FHSP plans based on the predictors tests, which is hoped for, these tests find no significant influencers and we fail to reject the null hypothesis. Based on the findings in the literature review, I hypothesized that the study would find patterns of inequity in the data about offerings and outcomes of the HB 5 graduation plans. More specifically, I hypothesized that there are patterns in the offerings of endorsements based on the type of school districts as well as racial and socioeconomic status of the populations served by the district. In other words, I expected the statistical analyses to find predictor variables have a statistically significant impact on the response variable, rejecting the null hypotheses of these tests.

I anticipated that rural districts offer students fewer options for endorsements due to limited number of staff and small class sizes, while suburban districts offer students the widest selection due to availability of resources. I expected to find more variation in urban districts, with some offering a wide range and some having limited offerings. As for outcomes of the graduation plans, I expected more students in rural districts and districts with more students of minority ethnic status and economic disadvantage are enrolled in FHSP plans instead of the 4x4 plans sooner than others. I expected to find that students of color and students of low socioeconomic status are underrepresented or less likely to be enrolled in the higher track graduation plans that render students eligible for university admissions and overrepresented in lower track plans that do not. I anticipated this finding due to the previously discussed research findings on the impacts of hierarchical, multitiered tracking structures (Anderson & Oakes, 2014, Rubin, 2008, Oakes, 2005). I expected that rural and urban districts have greater disparities and show more inequalities due to the variation in socioeconomic makeup and racial composition of the residents in those areas.

Data and Variables

All data used in this study were collected by and obtained from TEA through regular reporting from school districts. Each district is given a district number that was used as the matching or linking descriptor across all reports. Portions of the data were procured from the TEA website and are available for public access. Reports that are publicly available pertaining to enrollees in academic years 2014–2015, 2015–2016, and 2016–2017 and were leveraged in this study include district type, count of FHSP enrollment by endorsement combination, count of FHSP enrollment by distinguished level of achievement and ethnicity,[1] statewide district enrollment totals by grade, statewide district totals by grade and gender, statewide district totals by grade and ethnicity, statewide limited English proficient (LEP) district totals by grade, and statewide economically disadvantaged district totals by grade. Reports that are publicly available pertaining to graduates in academic years 2014–2015 and 2015–2016 and were leveraged in this study include count of FHSP graduates by endorsement combination, count of FHSP graduates by distinguished level of achievement and ethnicity, and Texas Academic Performance Report (TAPR).[2]

Some data were obtained through public information request (TEA PIR #30827) at my cost due to the lack of availability online. I requested that all FHSP graduate reports and FHSP enrollment reports for 2014–2015 and 2015–2016 be amended to include disaggregated data for LEP students, economically disadvantaged students, and gender. I also requested the 2016–2017 FHSP enrollment reports that will be posted in the public domain by the end of the academic

[1] The Count of FHSP Enrollment by Distinguished Level of Achievement and Ethnicity is currently not available on the website for 2016–2017 and was provided for this study by TEA through a secure portal, though the report will be posted on the website by the end of the 2017–2018 school year as a public report.
[2] TAPR reports that pertain to graduates in 2014–2015 and 2015–2016 are listed as the 2015–2016 and 2016–2017 TAPR, respectively.

year 2017–2018. Those requests were all met, and TEA provided several of those reports through a secure data release on November 21, 2017, and then the remaining reports on December 19, 2017. I also requested an "all students" category be added to every FHSP graduate and FHSP enrollment report. This request was denied by TEA, citing its responsibility to protect student-identifying information as charged under the Family Education Rights and Privacy Act (FERPA) and indicating that if it provided totals some students might be identified through the reports. The implications of the inability to gain access to total enrollment and graduation numbers from TEA is addressed later in this chapter.

TEA does not collect data around the endorsement offerings of each district. TEA hired the American Institute for Research (AIR) to conduct an evaluation of HB 5 implementation that included collecting survey data about the endorsement offerings in each district. The final response rate of districts included in the analytic sample was 81 percent (AIR, 2015), and a report was produced in October 2015. An updated version of that report is anticipated in early 2018. The 2015 report used descriptive statistical analyses to indicate the percentages of districts that offered each endorsement in 2014–2015 and how many endorsements were offered in districts across the state. The report did not use inferential statistics to determine if there were relationships between the endorsement offerings and other variables such as racial and socioeconomic makeup of students or the type of district.

TEA provided the raw data used for the 2015 report to me upon request for this study. However, AIR removed all district-identifying information to keep the data anonymous to TEA. Unfortunately, this makes statistical analysis considering district characteristics impossible. As TEA does not collect data around the endorsements and the AIR data was not identified by district, I needed to identify what endorsements districts are offering. For purposes of this study,

I defined a district's endorsement offerings as the endorsements in which that district has at least one student enrolled. I used the data available about student enrollment to create a dichotomous variable for each school year around district offerings for each endorsement. If a district had one or more students enrolled in an endorsement during a school year, by itself or as part of an endorsement combination, the answer to the question of whether the district offers that endorsement is *yes* and the dichotomous variable was given a value of 1 for that district. If a district had no students enrolled in that endorsement, by itself or as a combination of endorsements, the answer to the question of whether the district offers that endorsement is *no* and the dichotomous variable was valued at 0 for that district. While some districts might argue they offer more endorsements than those in which students are currently enrolled, I focused on what the district is currently providing to their students. Once each district had been assigned a *yes* or *no* for offering each endorsement, a count was performed to find out how many endorsements each district offers.

The TEA reports *Count by FHSP Enrollment by Endorsement Combinations* (n.d.) provide the "unduplicated count of enrolled students who are pursuing or have earned each endorsement or set of endorsements" (p. 1). In other words, no student is counted twice in the categories TEA has defined. It defines enrollment combinations as the single endorsements, and then reports by each possible combination of the five enrollments. This study considers the graduates and enrollees of each individual endorsement and then condenses the combinations that TEA provides into only two categories: combinations of two or more endorsements that include STEM and combinations of two or more endorsements that do not include STEM.

In all of the reports provided by TEA, any observation of student count that is between 0 and 5, or values of 1–4, is masked by using a placeholder (–9999999, –999) instead of reporting

the actual value. TEA does this in an effort to protect student-identifying information in accordance with FERPA rules. A statement about masking appears on each page of the TEA website where reports are downloaded. This is an example of a statement about the convention of masking student data that is on the Student Graduate Reports page (TEA, n.d.):

> This page provides counts of the number of secondary school graduates for the specified year, by graduation plan and by ethnicity. Results are available either as a web page or a comma-delimited file. The data will be summarized for a district, for a region, or for the entire state. Values will be masked in order to comply with FERPA. Values masked on web page reports will be replaced by the characters "N/A." Values masked in comma-delimited files will be replaced by the value "–9999999." (p. 1)

The masking placeholders represent small numbers of students in the categories where they are found. Naturally, the districts with smaller numbers of students (primarily rural districts) have many more masked values than their larger counterparts when disaggregating data for reports, though it is not unusual to see a masked value for some categories in larger districts as well. Students of ethnic minority and low-socioeconomic status in most districts have smaller numbers; therefore, these categories are more likely to need masking placeholders in TEA reports to prevent individual student identification through district-level reports.

These masks need to be addressed before statistical analysis can be applied to the data. Treating these categories with masked values causes issues for careful consideration. One choice is ignoring those values, using the values of 0 from districts and the values of 5 and above, but treat the masked values as 0. This requires the recognition that the analysis will be based on an undercount in the data. Due to my focus on investigations that pertain specifically to the

influence that racial composition and socioeconomic status have on the offerings and outcomes of the HB 5 graduation plans, I chose not to use any strategies that undercount students in these categories. If districts are serving students in these categories, they should be counted and included in any studies and reports about the district.

Erring on the side of overcounting rather than undercounting to better consider students in the minority categories, I experimented with two approaches to dealing with the masking placeholders. The first method was using a transformation on all data, essentially using categories of five in place of the actual counts. This means that 0 students are shown as 0 after the transformation, counts of 1 to 5 students (all placeholders and counts equal to 5) are shown as 1, counts of 6 to 10 students are shown as 2, and so on. This approach resulted in severe overcounts in student data, as it lumped counts that were on the low end of values masked by the placeholder with a count of 5 in one category. When using the counts to sum or provide proportions, this overcount was problematic.

The next approach I tried was replacing the masking place holders with the mean number of students that might be represented in that category, $\frac{1+2+3+4}{4} = 2.5$. This approach means that some observations are still overcounted, but there are some undercounted that provide balance. Mathematically, the mean should still represent a summary of the data. We have no way of knowing how the masked observations are spread within the range of possible values. When using this approach, it still seems that there are overcounts, particularly in the rural districts' data reports and those categories with low enrollment. This indicates that more of the masked values actually fall beneath the mean value of 2.5 than above. This over count is far less severe than with the data transformation approach previously described. Without a better option or way of further identifying the actual values that are masked, this was determined to be the most accurate

of the possible methods to use in order to proceed with the study. Throughout the study, all observations that were masked by TEA to represent a number of students between 1 and 4 have been replaced with the mean of possible values, 2.5. The statistical analysis, including descriptive and inferential statistics, in Chapters 4, 5, and 6 includes considerations made due to this estimation that assume these numbers are upward boundaries.

The district is the unit of analysis in this study. TEA collects data at the district level. Only 5.3 percent of the districts participating in the AIR evaluation of HB5 implementation (2015) reported having different endorsement offerings at schools in their district. A future study might investigate whether students at different schools in a district have disparate offerings and outcomes, but this study focuses at the district level. There are 976 districts included in the study, which is all of the traditional public school districts that serve students in grades 9–12. All TEA reports used in this study consisted of raw data student counts for each district. There are 295 student counts, or variables, that were taken from TEA reports for each district. Whenever possible, student counts were used directly from TEA reports without performing any calculations. As previously mentioned, TEA does not provide total counts for "all student" categories; there are several other total counts needed for the study that were not provided. To obtain these counts, 196 variables were created by summing counts that TEA provided. In all cases, sums were calculated only if the categories being added were mutually exclusive or there was assurance that students were not counted in multiple categories. For example, TEA specifies that the counts in Count of FHSP Enrollment by Endorsement Combination are not repeating and that students are only counted in one endorsement combination, whereas the counts in other enrollment reports may contain overlapping counts of students. Other examples that were used as mutually exclusive categories are gender and grade level enrollment categories.

As mentioned in the previous paragraph, the mean value of the possible student count, 2.5, was used in place of any masking placeholders, causing some unavoidable inaccuracies in count. These inaccuracies are compounded when multiple categories with a placeholder for each observation is summed. To keep the compounding of replacement counts to a minimum, efforts were made to sum using methods that included the smallest number of categories needed to get a total count. For example, TEA provided counts of FHSP enrollment by gender and by endorsement combination. To find the total number of enrollees in FHSP, male and female categories were summed. Because there are only two categories to add for the total, this method is more accurate than summing the endorsement combinations where there are eight categories. If each observation was a placeholder, the maximum number of times the mean of the possible values is added together is two when summing gender categories for total, whereas with the endorsement combinations the maximum number is eight. The latter increases the number of times the estimate is used in calculations and therefore introduces a greater possibility of increasing the inaccuracy in the total. TEA does not provide a count of the male and female graduates. It also does not provide a count of the total economically disadvantaged enrollees at the high school level, so an estimate was obtained by finding the proportion of noneconomically disadvantaged students out of the total enrollment of the district, subtracting that proportion from one, and using that as the proportion of economically disadvantaged students out of the total enrollment at high school. Appendix A provides a detailed list of TEA reports accessed and variables used for the study.

As districts in Texas vary greatly in size, count data of student enrollment and graduates is not useful in considering trends and comparing and contrasting patterns. To have more useful data to compare, 284 proportion variables were calculated to use in the study. These proportions

are the data points for which the study examines descriptive statistics. The GLMs and MEMs also provide insights about proportions of students who are enrolled in FHSP plans and are enrolled and working toward the distinguished level of achievement. The data around offerings are the same regardless of district size, so variables related to offerings are the only count variables used in the study.

Upon calculation of the proportions, it becomes apparent that the use of the mean of possible values, 2.5, in place of the masked observations causes overcounts. In some cases, particularly in rural districts with small numbers of students and districts with small numbers in subcategories by ethnicity or economic status, proportion calculations resulted in values over 1. In a specific example, the number of graduates on the FHSP plans in 2014–2015 was small, with a mean proportion of graduates in districts across the state of less than 10 percent. When that relatively small number students is then looked at by endorsement enrollments or subgroups of students, there are many values that are low enough that they require masks. In both descriptive and inferential analysis of the data, all proportions have been truncated to equal 1 if the calculations resulted in a proportion above 1 to mitigate the overcounts and keep the values consistent across the study. In cases such as the 2014–2015 graduate numbers, for which some proportions are strongly impacted by the replacement of masking values, those values were not used for analysis. Appendix B provides all proportion variables and description of calculations.

Significance of Study

The scholarship around tracking is extensive and primarily shows evidence that multitiered, hierarchical courses of study provide no benefit for those students in the high tracks and negatively impact those students in average and low tracks. However, as more modern structures evolve, investigations must be performed to determine if the outcomes of these new

structures mirror those of the previous research around tracking. HB 5 introduced a set of graduation plans, including four endorsements that do not prepare students to a level that meets the admissions requirements of most universities in Texas and only one endorsement that prepares students for university-level study after graduating from K–12. The investigation of the HB 5 offerings and outcomes in this study expands the evidence pool to include the impacts of this particular policy in Texas. This study is important because growing the evidence base to include current contexts, motivations, and approaches to implementing school structures increases the relevance of the scholarship on this topic.

Limitations

The most impactful limitation in the study is the masking placeholders in all data from TEA. The placeholders and their impact was discussed at length in the Data and Variables section of this chapter. Three other limitations should also be acknowledged in this study. First, HB 5 was passed in 2013, and the graduation plans were implemented fully with the freshmen who started high school in 2014–2015. This means the first class with all students on the HB 5 graduation plans will graduate in 2018. The data analyzed in this study represents those students who are on the graduation plans under HB 5 beginning in the graduating class of 2015. We must consider that there were students who were still on the previous plans at this time as well, which may mean that there is a selection bias within the data from districts. The previous plans provided less flexibility to students, requiring more specific coursework in advanced courses. Students who were on track to meet those requirements may have stayed on the old plans, while students who were not may have been more likely to switch. As FHSP plans have been further implemented, more information about those plans have been collected. TAPR included variables around the graduation plans under the HB 5 for the first time, including total numbers of FHSP

graduates for the class of 2015. Current data are available for only 2014–2015, 2015–2016, and 2016–2017 enrollees and 2014–2015 and 2015–2016 graduates. Future studies of classes under FHSP will contribute more to the nascent understandings possible in this study.

The second limitation is that this study uses the data available from the state to increase the probability that the study has influence and impact on the policies in Texas and beyond. Through the quantitative analysis in the study, we see summaries of the data, measure relationships between variables, and determine how much variation in dependent variables can be attributed to the change of each independent variable. However, the study does not answer questions about whether the independent variables caused the variation in the dependent variable or why there is a relationship between them. The field would benefit from future studies employing quantitative and qualitative research methods capable of informing questions of why and looking for causal links between these variables.

The third limitation is the necessity of using TEA's definition of *economically disadvantaged* to identify students who are experiencing low socioeconomic status, which can greatly limit the resources available to students, both in and out of schools. TEA uses the title of *economically disadvantaged* for these students and defines that variable as being based on the students' eligibility for a free and reduced lunch (FRL) and other federal programs as a proxy variable for indicating low socioeconomic status. As Harwell and Lebeau (2010) pointed out, while both socioeconomic status and eligibility for FRL primarily rely on household income, this proxy is not without issue. One issue with FRL is that this measure can be inaccurate. Harwell and Lebeau provided estimates that nearly 20 percent of students are misclassified as either eligible for FRL when they are not or not eligible for FRL when they should be. Another issue is that the FRL variable is dichotomous, indicating only if a student's household income is above or

below a chosen arbitrary limit. Students living in households with incomes just above limit of being eligible for FRL who are ineligible for the program are classified the same way as very wealthy students. This classification system does not differentiate a student who lives in a household with income very close to but just above the limit and a student who lives in lavish luxury, while that student may actually have much more similar access to resources and identify more with the experience of a student who is just below the limit and is classified in the opposite bucket. Similarly, those who live in households with incomes just below the limit are classified the same way as students in households with incomes that are significantly lower. Due to the dichotomous nature of the measure, the FRL variable is not ideal to measure socioeconomic status. However, this study uses available data, and this is the only measure that TEA collects connected to the household income of students.

Chapter Summary

In this chapter, I discussed the research strategy and justification, methodological approach and research questions, data and variables, and limitations of the methodology. Chapters 4 and 5 will provide the details and results of the data analysis though descriptive statistics and inferential statistics, respectively.

CHAPTER 4

Descriptive Statistics

Introduction

This chapter presents the analysis and research findings from the use of descriptive statistics around offerings and outcomes of the HB 5 graduation plans. The descriptive statistics paint a picture of the endorsement offerings and outcomes from the FHSP implementation across the state as well as by urbanicity. The first section presents statistics around the endorsement offerings of districts across the state and contributes to answering the first research question. The second section turns to statistics about the enrollment and graduation proportions in FHSP and endorsements, while the third section considers the proportions around enrollments in and graduation on the distinguished level of achievement. These two sections contribute to answering the second research question. Special attention is paid to the analysis around the enrollment and graduates of plans that render students eligible for university admission. Chapter 5 addresses the inferential statistics and presents models measuring the relationships between interdependent variables that influence the offerings and outcomes of the HB 5 graduation plans.

Endorsement Offerings

HB 5 was passed in 2013, making 2014–2015 the second school year when districts could offer enrollment or graduation on the FHSP plans. In 2013–2014, enrollment and graduation were completely voluntary. In 2014–2015, incoming freshmen were all enrolled in FHSP but everyone else enrolled in high school could choose to enroll in FHSP or the previous plans. Every entering class since then has been enrolled in the FHSP plan, so the last year included in this study, 2016–2017, should only have students who have been enrolled for four years that are still on the previous graduation plans (TEA, n.d. am). All students who have been

enrolled for three years or less (freshmen, sophomores, and juniors who have not been held back a grade) are all enrolled on the FHSP plan.

In 2014–2015, the mean number of endorsements districts offered (or had at least one student enrolled in) was 3.6. The mean number of endorsement offerings for the 52 urban districts and the approximately 240 suburban districts is about 4.3 endorsements compared to the mean in the approximately 680 rural districts of 3.3 endorsements. In 2015–2016 and 2016–2017, the mean number of endorsements offered across the state rose to 4.3 and 4.4, respectively. Rural districts continued to have the lowest mean number of endorsements offered with 4 in 2015–2016 and 4.2 in 2016–2017. The minimum values in all urbanicity levels for the 2014–2015 number of endorsements is 0, as shown in Table 3, which indicates there were districts at all levels of urbanicity that were not yet offering any endorsements in 2014–2015. In 2015–2016 and 2016–2017, there were suburban and rural districts who still did not report offering any endorsements; however, the minimum number of endorsements offered by urban districts rose to 1 and then again to 4 over those two years. This is interesting to note because the state policy requires freshmen to be enrolled in FHSP as they enter beginning in 2014–2015, but there are suburban and rural districts reporting to have no students enrolled in any endorsement through 2016–2017. It is possible to have students enrolled in FHSP without being enrolled in an endorsement, but students are required to choose an endorsement in which to enroll for their freshmen and sophomore years and then are allowed to remove that endorsement if they choose during their junior year (Texas Education Service Center 20, n.d.), so the freshmen and sophomores enrolled in the FHSP plan in 2016–2017 should have an endorsement. There were districts at all levels of urbanicity that offered all five endorsements every year. In fact, the median for districts in all urbanicity levels in each year was 5, with the exception of rural

districts in 2015. That indicates that at least half of the districts in each category were offering all five endorsements each year, with half of the rural districts offering at least four endorsements during 2014–2015.

Table 3: Mean Number of Endorsement Offerings by Year and Urbanicity

	Urban			Suburban			Rural		
Year	Min	Med	Max	Min	Med	Max	Min	Med	Max
2015	0	5	5	0	5	5	0	4	5
2016	1	5	5	0	5	5	0	5	5
2017	4	5	5	0	5	5	0	5	5

Data obtained from Texas Education Agency (n.d.c)

Each endorsement has not been offered uniformly across districts. In 2014–2015 at the beginning of the implementation, the endorsement offered by the most districts in the state was the Multidisciplinary endorsement, with 80 percent of districts reporting to have students enrolled under this endorsement. Business and Industry, STEM, Arts and Humanities, and Public Service followed in popularity with offerings in 78 percent, 70 percent, 69 percent, and 61 percent of districts respectively reporting students enrolled. In 2017, the Multidisciplinary endorsement remains the most implemented endorsement, with 98 percent of districts reporting having students enrolled. The others also maintain their rank order of implementation, with 93 percent of districts having students enrolled in Business and Industry, 88 percent in STEM, 85 percent in Arts and Humanities, and 77 percent in Public Services. As reported in the previous section around the number of offerings in each district, the data show differences in which endorsements districts are offering by urbanicity (Table 4). By academic year 2015–2016, more than 90 percent of both urban and suburban districts offered each endorsement. In 2016–2017, more than 90 percent of rural districts were offering the Multidisciplinary and Business and Industry

endorsements, but just 84 percent offered the STEM endorsement, less than 80 percent the Arts and Humanities endorsement, and less than 70 percent the Public Services endorsement.

Table 4: Mean Proportion of Districts Offering Each Endorsement by Year and Urbanicity

	2015			2016			2017		
	Urban $n = 52$	Sub $n = 240$	Rural $n = 679$	Urban $n = 52$	Sub $n = 242$	Rural $n = 680$	Urban $n = 52$	Sub $n = 241$	Rural $n = 681$
Arts	0.885	0.863	0.610	0.962	0.934	0.744	1	0.975	0.794
Business	0.904	0.871	0.732	0.962	0.950	0.876	1	0.975	0.913
Public	0.865	0.808	0.518	0.962	0.901	0.654	1	0.934	0.690
STEM	0.846	0.850	0.636	0.981	0.930	0.807	1	0.963	0.840
Multidisc	0.846	0.858	0.779	0.981	0.963	0.950	1	0.983	0.982

Data obtained from Texas Education Agency (n.d.c)

Endorsement Enrollment and Graduation Under FHSP

Students entering high school beginning in 2014–2015 were enrolled into FHSP as a default, but students who were enrolled in high school before that year had the choice to move to the new FHSP plans or stay on their previous plans (TEA, n.d. am). The state mean proportion of students enrolled in FHSP of all high school students enrolled in 2014–2015 was just above a third at .348, growing to well over half at .628 in 2015–2016 and even higher with .837 of all students enrolled in high school choosing or being defaulted into the new plans in 2016–2017. In 2017–2018, only students who have been held back a grade are allowed to be on previous plans, with all other students having been defaulted into FHSP. Table 5 shows the mean number of students in several subgroups of students who were enrolled in FHSP out of the total enrollees in that subgroup for each year. In 2014–2015, most subcategories show similar mean proportions to the state mean proportion at just above a third, with exceptions of African American/Black and LEP, which are both above half. These two categories continue to have the largest proportions of students enrolled in FHSP through 2017, with the proportion of LEP students being well above the rest with a mean proportion at nearly 100 percent. Also important to note, the median

proportion of these two subgroups in 2017 is 1, meaning that more than half of the districts in the state have all students in this subgroup enrolled in school under FHSP plans. This is to be expected for the LEP subgroup, which also has a high mean proportion. For the median proportion to be so high, effectively showing all students in this subgroup in at least half of the districts in Texas while the mean proportion for African American/Black students is only at .877, there must be some school districts with a low number of African American/Black students enrolled. The proportion of economically disadvantaged students enrolled in FHSP starts off as the lowest proportion of subcategories and grows slower than other categories with only 78 percent of these students enrolled in FHSP in 2016–2017 while all of the mean proportions for the other subgroups are at least 83 percent.

Table 5: Measures of Center of Proportion of FHSP Enrollment of Total High School Enrollment by Year and Student Subgroup

	State Mean			State Median		
	2015	2016	2017	2015	2016	2017
African American/Black	0.509	0.707	0.877	0.390	0.688	1.000
Hispanic/Latino	0.380	0.663	0.860	0.321	0.609	0.856
White	0.361	0.639	0.847	0.299	0.579	0.833
Limited English Proficient	0.570	0.785	0.976	0.500	0.880	1.000
Economically Disadvantaged	0.335	0.593	0.778	0.289	0.552	0.774
Male	0.354	0.634	0.839	0.298	0.583	0.830
Female	0.354	0.630	0.832	0.296	0.578	0.818

Data obtained from Texas Education Agency (n.d.c, d, r, s, af)
Note: 2015 $n = 976$, 2016 $n = 976$, 2017 $n = 977$

In Texas, the proportion of a district's student population that is composed of particular subgroups varies. Specifically, a district's student body characteristics can look very different based on district type or urbanicity. Table 6 shows the mean proportions of each subgroup by urbanicity from the years discussed in this study, 2014–2015 through 2016–2017. This

information is provided to add context to the discussion. The data show that the sum of mean proportion for African American/Black, Hispanic/Latino, and White students is close to 1 in all urbanicities, so these are the primary ethnicity groups represented in Texas districts. In urban areas, the mean proportion of Hispanic/Latino students is more than .5, making that group the majority ethnic group in these districts. In suburban and rural districts, the mean proportion of Hispanic/Latino students is lower, but is still relatively large with more than .4 and more than .35, respectively. African American/Black students on average are more than a tenth of the population in urban districts, just less than a tenth in suburban, and just less than .07 in rural districts. The mean proportion of White students in urban districts is less than a third, but closer to a half for suburban districts and more than .55 in rural districts. The mean proportion of LEP students in each district is low, with urban districts having the highest representation at .055, while suburban and rural districts are a bit lower. The mean proportion of economically disadvantaged students in each district is more than half in all urbanicities, with suburban districts having the lowest mean proportions at .532 and urban districts having the highest at .606.

Table 6: Mean Proportion of Students in Subgroup Enrolled in Texas High School Districts by Urbanicity

	Urban	Suburban	Rural
African American/Black	0.128	0.097	0.066
Hispanic/Latino	0.538	0.410	0.357
White	0.289	0.449	0.557
Limited English Proficient	0.055	0.039	0.029
Economically Disadvantaged	0.606	0.532	0.587

Data obtained from Texas Education Agency (n.d. I, k, m, y, aa, ac, ah, aj, al)

In 2014–2015, about 9.6 percent of graduates were on an FHSP plan. That proportion nearly doubled for 2015–2016 at 18.2 percent of graduates. Table 7 shows the state mean and

median proportion by subgroup. The median proportion for all categories for all years was 0, which means more districts had no students graduating on FHSP plans than those who did have students graduating on FHSP. This implies that while the number of districts with FHSP graduates were fewer, those districts had a high numbers of graduates on FHSP in order for the mean proportions to be much higher than 0. This is especially true for the African American/Black and LEP student categories, where the mean proportions for both years are close to 40 percent and 50 percent, respectively, while the median proportions are 0.

Table 7: Measures of Center of Proportion of FHSP Graduates of Total Graduates by Year and Student Subgroup

	State Mean		State Median	
	2015	2016	2015	2016
African American/Black	0.362	0.334	0	0
Hispanic/Latino	0.039	0.035	0	0
White	0.027	0.031	0	0
Limited English Proficient	0.497	0.447	0	0
Economically Disadvantaged	0.010	0.016	0	0

Data obtained from Texas Education Agency (n.d.g, h, n, t, u, ac)

Proportions of enrollment by endorsement of those who are enrolled in FHSP follow similar patterns to the offerings of endorsements. Table 8 shows the state mean and median proportions for each endorsement and each year. The state mean proportions show that more students are enrolled in the Multidisciplinary endorsement in all years than any other endorsement, with an average of nearly a third of students in each district in 2015–2016 and 2016–2017. The second highest mean proportion of enrollment is in the Business and Industry endorsement, with nearly a fifth of students. The Public Services endorsement has approximately 10 percent of students every year, STEM is just below 10 percent each year (hitting a low of 8 percent in 2017), and Arts and Humanities is just approximately 6 percent each year. Students in

enrollment combinations increases each year. Considering both the enrollees of the STEM endorsement as a single endorsement and the enrollees in a combination of endorsements that includes STEM, the enrollment in STEM has increased more than 1 percent each year. It is interesting to note that the median value is lower than the mean for each endorsement in 2015 and much lower in some cases as with the Multidisciplinary endorsement. This indicates that there are a greater number of lower proportions in the data set, and there are fewer but more extreme high proportions pulling the means up to their current value.

Table 8: Mean Proportion of Enrollment by Endorsement of FHSP Enrollment by Year

	State Mean			State Median		
	2015	2016	2017	2015	2016	2017
Arts	0.064	0.066	0.060	0.036	0.084	0.042
Business	0.191	0.215	0.195	0.161	0.183	0.159
Public Services	0.114	0.119	0.098	0.044	0.136	0.043
Multidisciplinary	0.239	0.312	0.311	0.111	0.300	0.219
STEM	0.092	0.093	0.080	0.046	0.115	0.049
Combination with STEM	0.058	0.069	0.097	0.000	0.137	0.049
Combination without STEM	0.073	0.098	0.140	0.000	0.165	0.072

Data obtained from Texas Education Agency (n.d.c, r, af)
Note: 2015 n = 976, 2016 n = 976, 2017 n = 977

Table 9 shows the proportions of FHSP enrollment by endorsements and by urbanicity. Urban and suburban mean proportions for each endorsement enrollment are similar to each other, within about two percentage points. One notable exception is that suburban districts in 2015–2016 and 2016–2017 have a mean of about five percentage points lower than urban districts for the Public Services endorsement. Also, in 2016–2017, the suburban mean proportion is about five percentage points higher than the urban districts mean proportion for the Multidisciplinary endorsement enrollment. Rural districts have some prominent differences from the urban and suburban district mean proportions, though. The rural mean proportion for the Arts and

Humanities endorsement is lower than urban and suburban by three percentage points in all three years. Rural districts have a much lower mean proportion of students in the Public Services endorsements by more than eight percentage points every year. They are higher than the suburban and urban districts on enrollment in the Multidisciplinary endorsement by more than seven percentage points on the mean proportion each year. Interestingly, rural districts also have the highest mean proportion of students enrolled in the two or more endorsement combination categories in each year.

Table 9: Mean Proportion of Enrollment by Endorsement of FHSP Enrollment by Year and Urbanicity

Endorsement Enrollment 2015	Urban	Suburban	Rural
Arts	0.084	0.087	0.054
Business	0.187	0.202	0.188
Public Services	0.203	0.174	0.086
Multidisciplinary	0.161	0.190	0.262
STEM	0.092	0.108	0.086
Combination with STEM	0.026	0.044	0.065
Combination without STEM	0.046	0.059	0.080
Endorsement Enrollment 2016	Urban	Suburban	Rural
Arts	0.092	0.082	0.058
Business	0.209	0.211	0.217
Public Services	0.219	0.173	0.092
Multidisciplinary	0.223	0.241	0.344
STEM	0.101	0.093	0.092
Combination with STEM	0.034	0.052	0.078
Combination without STEM	0.071	0.089	0.104
Endorsement Enrollment 2017	Urban	Suburban	Rural
Arts	0.087	0.080	0.051
Business	0.206	0.210	0.189
Public Services	0.205	0.155	0.069
Multidisciplinary	0.214	0.263	0.336
STEM	0.093	0.085	0.077
Combination with STEM	0.050	0.075	0.108
Combination without STEM	0.099	0.120	0.150

Data obtained from Texas Education Agency (n.d.c, r, af)
Note: 2015 n = 976, 2016 n = 976, 2017 n = 977

Enrollment and Graduation Under FHSP Distinguished Level of Achievement

The distinguished level of achievement is the highest designation available under the FHSP plans. Students who graduate with this level earn the credits needed to apply for admission into a four-year university in Texas. Students who graduate with an endorsement without the distinguished level of achievement do not earn the credits needed to apply to a four year university in Texas. In 2014–2015, the average proportion of students in a district enrolled under FHSP graduation plans who were also on the distinguished achievement distinction was about 37 percent. By 2016–2017, that mean proportion of students enrolled in FHSP and in the distinguished level of achievement had increased to about 63 percent. There is some variation in the mean proportion of students enrolled in the distinguished plans based on urbanicity (Table 10), with urban districts having the highest proportion of students enrolled in the distinguished level in 2017. Table 11 shows the mean proportion of students graduating under the distinguished designation in 2015–2016 and the differences in the means across urbanicities. The mean proportion of students graduating under the distinguished achievement plan in rural districts looks much higher than urban and suburban. This is one set of data that I believe has inflated proportions due to multiple low and therefore masked values that were replaced by the average of the possible values for that observation, which may overcount the sums and therefore proportions.

The distinguished designation on FHSP requires the same course requirements that were required under the previous graduation plan referred to as the Recommended High School Program, which was the default for all students and at the time was not the highest designation available. Under the previous policy, there was a Recommended and Distinguished program that require the same or additional course credits to the FHSP distinguished level of achievement

requirements. The Recommended and Distinguished programs under the previous policy and the current distinguished plan under FHSP ensure that students get the course requirements they need in order to apply for admission to a four-year university in Texas. In 2012–2013 about 82 percent of students in Texas graduated on the Recommended or Distinguished program. In 2013–2014 and 2014–2015, of those students not on FHSP, about 84 percent of students graduated on the Recommended or Distinguished plan (TEA, n.d.a, b, c). So before the FHSP plan, more than 80 percent of students in the state were graduating on a plan that allowed them to apply to a four-year school, while the most recent TEA data shows less than 65 percent are enrolled in or graduating under a plan that render them eligible to apply for university upon high school graduation. In 2016–2017, there were still students who were enrolled in and graduating under the Recommended and Distinguished high school programs.

Table 10: Mean Proportion of FHSP Enrollees at the Distinguished Achievement Level by Year and Urbanicity

	State	Urban	Suburban	Rural
2014–2015	0.367	0.366	0.420	0.348
2015–2016	0.650	0.630	0.665	0.645
2016–2017	0.631	0.704	0.662	0.615

Data obtained from Texas Education Agency (n.d. d, e, f, r, s, t, af, aj)

Table 11: Mean Proportion of FHSP Graduates at the Distinguished Achievement Level by Urbanicity

	State	Urban	Suburban	Rural
2015–2016	0.629	0.313	0.499	0.699

Data obtained from Texas Education Agency (n.d. g, h, t, u)

The state-level data shows that all subgroups of students are increasing in the proportions enrolled in FHSP. Table 12 shows that initially African American/Black students and LEP students had a higher proportion of their subgroups enrolled in FHSP. These higher numbers

may be a product of inflation due to low numbers in each category being masked. Over the three years in the study, the proportion of each subgroup enrolled in the FHSP distinguished level of achievement is approximately the same across subgroups.

Table 12: Mean Proportion of Students in Subgroup Enrolled in the Distinguished Plan Out of Students in Subgroup Enrolled in the FHSP Plan

	2014–2015	2015–2016	2016–2017
African American/Black	0.525	0.593	0.624
Hispanic/Latino	0.358	0.538	0.603
White	0.385	0.569	0.634
Limited English Proficient	0.523	0.586	0.622
Economically Disadvantaged	0.347	0.541	0.608
Male	0.357	0.547	0.616
Female	0.371	0.571	0.643

Data obtained from Texas Education Agency (n.d. c, d, q, r, ae, af)

The STEM endorsement is the only endorsement that due to its own requirements allows students to earn the course work for the distinguished level of achievement without going above and beyond the endorsement requirements. The mean proportion of students in districts in 2014–2015 enrolled on the distinguished level of achievement also enrolled in the STEM endorsement (as a single endorsement enrollment or as a part of an endorsement combination) was high at just more than 60 percent. This number may be inflated due to low numbers in each category being masked and therefore replaced with the average of possible values for the category, which is 2.5. The next two years offer a lower mean proportion of students from each district who are graduating on the distinguished plan and with the STEM endorsement, at less than 40 percent (Table 13).

Table 13: Mean Proportion of Students in Enrolled in the Distinguished Achievement Plan and in the STEM Endorsement (or a Combination of Endorsements Including STEM)

	2014–2015	2015–2016	2016–2017
State-level proportion	0.607	0.373	0.380

Data obtained from Texas Education Agency (n.d. d, f, r, t, af, ag))

Chapter Summary

In this chapter, I discussed the descriptive statistics that provide a clear picture of the context of the implementation of the HB 5, specifically around the offerings and outcomes of the endorsements in FHSP. Chapter 5 provides the results of the inferential data analysis, and Chapter 6 discusses the implications of the results.

CHAPTER 5

Inferential Statistics

Introduction

This chapter presents the analysis and research findings from the use of inferential statistics to explore offerings and outcomes of the HB 5 graduation plans. Where descriptive statistics give a picture of the endorsement offerings and outcomes from the FHSP implementation across the state, inferential statistics provide a measure of the relationships between the predictor variables of racial and socioeconomic composition of each district and the urbanicity of each district and the offerings and outcomes of the HB 5 graduation plans in academic years 2014–2015, 2015–2016, and 2016–2017. The first section presents analysis of the endorsement offerings of districts across the state and contributes to answering the first research question. The second section turns to statistics about the enrollment and graduation proportions in FHSP and endorsements, while the third section presents the analysis around the enrollment in distinguished levels of achievement on FHSP. These two sections contribute to answering the second research question. Chapter 6 addresses the implications of the findings from the analysis of the statistics presented in Chapters 4 and 5.

Endorsement Offerings

As discussed in Chapter 3, this study leverages the definition of a district offering an endorsement as that district had at least one student enrolled in that endorsement. Dichotomous variables were created for each of the five endorsements that HB 5 outlines; for each variable, the district was assigned a value of 1 for that endorsement offering if it had at least one student enrolled. If the district did not have at least one student enrolled in that endorsement, it was assigned 0 for the value of the variable. A total number of offered endorsements was then created

by adding the five dichotomous variable values together for each district. A Poisson model was used because the focus response variable of total endorsements offered in this first model is a count variable.

First, I tested the use of a mixed-effect Poisson model that considers the relationship between the predictor variables, racial and socioeconomic composition of the district and type of district, and the outcome of total endorsement offerings measuring for effects within districts and between districts. The unconditional MEM provides only the fixed effects intercept and the random effects variance. However, in this model the random effect, or the variation of influences that occur between districts, was estimated to be nearly 0, indicating that the MEM is not the most appropriate fit for this relationship.

Instead, I tested Poisson models that considered only fixed effects, estimating standard errors clustered by district (Table 14). The first model that I fitted considered only the effect of the year on the number of offerings for each districts. That model indicates that the year is a statistically significant predictor of the number of offerings in a district, with an estimated incidence rate ratio (IRR) of 1.11. This estimate indicates that for the average district, the estimated number of endorsement offerings in each district increases by 11 percent with each year that passes. Next, I fitted a model that considered urbanicity as another influencer. This model indicated that compared to the average urban district, suburban districts do not have a statistically significant difference in the number of offerings of endorsements. However, the model shows that rural districts have a statistically significant difference in number of offerings from the average urban district, with an estimated IRR of .81 keeping all other predictors constant. This indicates that rural districts offer approximately 81 percent of, or 19 percent less than, the offerings in an average urban districts.

Table 14: Poisson Models for Total Endorsement Offerings

	Model 1 IRR	Model 2 IRR	Model 3 IRR	Final Model IRR
Total Endorsement Offering				
Year	1.108*** (0.01)	1.108*** (0.01)	1.109*** (0.01)	1.070** (0.02)
Urban (base)		1	1	1
Suburban		0.971 (0.02)	0.971 (0.02)	0.975 (0.05)
Rural		0.813*** (0.02)	0.814*** (0.02)	0.766*** (0.04)
Percent African American/Black			1.0002 (0.0009)	
Year Interaction with Urban (base)				1
Year Interaction with Suburban				0.996 (0.03)
Year Interaction with Rural				1.058* (0.03)
Observations	2919	2919	2919	2919
AIC	11162.1	11078.8	11080.8	11076.6
BIC	11174.1	11102.7	11110.6	11112.4

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

I then fitted several more models, looking for a relationship between the number of endorsement offerings in the district and the population composition in the district. I tested models that included year and urbanicity and added one of the following predictor variables: percent of African American/Black students in the district, percent of Hispanic/Latino students in the district, percent of economically disadvantaged students in the district, and percent of LEP students in the district. Each model showed higher AIC and BIC values than the model that only

considered year and urbanicity, indicating they are a worse fit for the data. Also, none of the additional predictor variables showed statistically significant influence on the outcome of number of endorsement offerings in the district. After fitting each one, I excluded these variables from the analysis to maintain the parsimony of the model.

Finally, I fitted a model that includes the year and urbanicity as predictors and includes influences from the interaction of those two predictors as well. This model indicated, as we had seen in previous models, the year and urbanicity—specifically rural districts as compared to urban districts—are statistically significantly influencers on the number of endorsement offerings in each district. It also shows that the interaction of year and rural urbanicity is also a statistically significant predictor. The IRR for year and rural districts is 1.07 and .77, respectively. Holding all other factors constant, this estimates that a change in year means an increase of 7 percent in the offerings of a district and that a rural district offers 77 percent of, or 23 percent fewer endorsements than an average urban district. The interaction of year and rural district has an IRR of 1.06, estimating for each year that passes in a rural district the increase in endorsement offerings is 6 percent more than the increase per year in an average urban district. As a demonstration of fit, I calculated the actual means and estimated mean from the model for each urbanicity district group for each year. Table 15 shows that the estimated mean and actual means are the same for each case.

Table 15: Comparing Actual Means to Means Estimated from FHSP Enrollment Model

	Estimated Mean	Actual Mean
Urban, 2014–2015	4.346	4.346
Urban, 2015–2016	4.846	4.846
Urban, 2016–2017	4.981	4.981
Suburban, 2014–2015	4.250	4.250
Suburban, 2015–2016	4.678	4.678
Suburban, 2016–2017	4.830	4.830
Rural, 2014–2015	3.275	3.275
Rural, 2015–2016	4.032	4.032
Rural, 2016–2017	4.220	4.220
N	2919	2919

Exponentiated coefficients

In addition to the total offerings response variable, I also fitted models that estimate the relationship between the offering of each endorsement and the same predictor variables. Because these models consider just the binomial variable of *yes* or *no* for each district offering each endorsement, logit models were used. Table 16 provides the odds ratios estimated by each model. The Multidisciplinary endorsement is the only one for which the year and urbanicity were not statistically significant influencers on whether it was offered. All other endorsements offerings in the districts were influenced at a statistically significant rate from year and in rural districts. In each instance, the offering was estimated to be much more likely for every year that passes when all other variables are held constant. The models also estimated that the offering of these four endorsements was less likely, with odds of at most 35 percent of the offerings in rural districts compared to an average urban district. The STEM, Arts and Humanities, and Public Services endorsements also showed statistically significant influence from the interaction of year

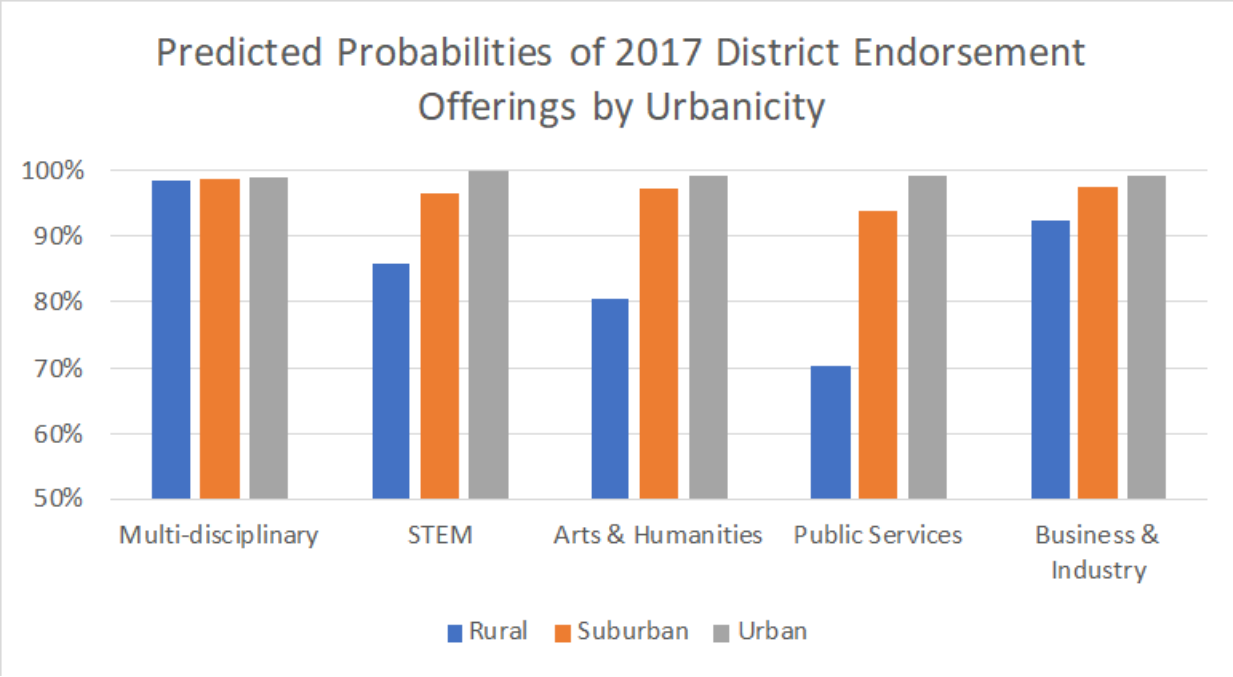
and status as a rural district. The IRRs for these variables are .161, .323, and .258, respectively. The models estimated that for each passing year the odds of a rural district offering the STEM endorsement decrease to .161 of the odds that the average urban district offer it, the odds of a rural district offering the Arts and Humanities endorsement decrease to .323 of the odds that the average urban district offer it, and the odds of a rural district offering the Public Services endorsement decrease to .258 of the odds that the average urban district offer it. The model estimating the relationship between the Business and Industry endorsement did not find the influence on the interaction between the year and status as rural district to be a significant influencer on the offering of that endorsement. Figure 1 illustrates the predicted probabilities from the model, which shows robustness of the test as the values are all within 2 percent of the actual proportions of districts offering each endorsement in 2016–2017.

Table 16: Generalized Linear Model for Each Endorsement Offerings: Odds Ratios Values

	Multi-disciplinary	STEM	Arts and Humanities	Public Services	Business and Industry
Urban (Base)	1	1	1	1	1
Suburban	1.050 (0.45)	1.058 (0.45)	0.851 (0.39)	0.708 (0.31)	0.786 (0.39)
Rural	0.608 (0.24)	0.348** (0.14)	0.225*** (0.10)	0.186*** (0.08)	0.329* (0.15)
Year	4.187 (3.13)	11.12** (8.97)	4.927** (2.58)	5.604*** (2.53)	4.269** (2.14)
Year Interaction with Urban (base)	1	1	1	1	1
Year Interaction with Suburban	0.829 (0.66)	0.196* (0.16)	0.493 (0.27)	0.334* (0.16)	0.589 (0.32)
Year Interaction with Rural	1.072 (0.82)	0.161* (0.13)	0.323* (0.17)	0.258** (0.12)	0.481 (0.24)
Observations	2919	2919	2919	2919	2919
AIC	1501.0	2633.1	2809.5	3244.2	2102.6
BIC	1536.9	2669.0	2845.3	3280.1	2138.5

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: Predicted Probabilities of Districts Offering Each Endorsement 2016–2017



Data obtained from Texas Education Agency (n.d.c)

Enrollment in and Graduation Under FHSP

The next relationship I investigated is the proportion of high school students enrolled in FHSP as impacted by district characteristics. I set out to examine the predictor variables of racial and socioeconomic composition of districts and type of district on enrollment in FHSP in these years when enrollment was optional for at least some students. With multiple years of data around enrollment in FHSP, I fitted a mixed-effects logit model to look for effects both within and between districts.

First, I fitted the base model that only predicted the fixed-effects intercept and the variance of the random effects. The ICC was .154, and there was a positive coefficient for the random effects, indicating that there is unmodeled variance in this relationship and an MEM helps identify the causes of that variance. The next model I fitted included the year as a random-effects parameter to see how if it contributes to the unmodeled variance. The test showed a better

fit than the base model through a much lower AIC and BIC value, as did the next model that included year as a fixed effect as well. Next, I fitted a model that included urbanicity as a fixed effect on its own and as an interaction with the year, which also indicated a better fit through AIC and BIC as well as statistically significant effects from year, status as rural district, and the interaction of year and status as a rural district. I then fitted a model that included the percent of African American/Black students of the student population. The model had a better fit as based on the AIC and BIC values and showed significance of the effect of the percent of the students who are African American/Black. This model had a better fit as indicated by lower AIC and BIC values. The percent African American/Black was not significant at an alpha level of .05 but the *p*-value was low at .07. Due to the low *p*-value and the lower AIC and BIC scores with the inclusion of the variable of percent of African American/Black students indicating the better fit of this model, I continued to include this variable in future models.

Next, I tested a series of models that included variables around the composition of the population of the district as fixed effects directly and as interactions with year and urbanicity. I used variables of the percent of high school students who are Hispanic/Latino, economically disadvantaged, LEP, and male. Many of these models either increased the AIC and BIC, indicating an inferior fit to the data, or reduced the parsimony to the point that all predictors were nonsignificant contributors to the variance. Table 17 provides the odds ratios and standard error for each term.

The model with the lowest AIC and BIC, or the best fit to the data, that still indicated significance of any variables included the variables of year, urbanicity, percent male, percent African American/Black, percent Hispanic/Latino, and the interaction of year with urbanicity and year with percent male. Of those variables, the model shows that the year, status as a rural

district, percent African American/Black, and the interaction between year and status as rural district are all significant factors at an alpha level of .05. The percent of students in district who are Hispanic/Latino does not technically meet the requirements of significance at an alpha level of .05 because it has a *p*-value of .051, but I consider it to be noteworthy and address this in the discussion in Chapter 6. Figure 2 is a model fit test for the number of students enrolled in FHSP.

The intercept of the final model is .42, which is the odds that a student would be enrolled in FHSP instead of the previous graduation plans in 2014–2015 in an urban district with average proportions of African American/Black, Hispanic/Latino, economically disadvantaged, and males students. The model shows that each year, holding all other variables constant, the odds that a student enrolls in FHSP instead of the previous plans increases by 2.28. The model also shows that if a student is enrolled in a rural district instead of an urban district, holding all other variables constant, the odds of enrollment in FHSP increase by .20. The interaction of the year and enrollment in a rural district also has an impact on the odds that a student enrolls in FHSP by an increase of .18 per year. The percent of the district's students who are African American/Black also impacts the odds of a student enrolling in FHSP. Holding all other variables constant, for each increase in the percent of students who are African American/Black, the odds are predicted to decrease, on average, by 0.009 that a student is enrolled in FHSP. Finally, for each percent increase of students in a district who are Hispanic/Latino, holding all variables constant, the odds of a student enrolling in FHSP in 2014–2015 are predicted to increase, on average, by 0.003.

Table 17: Mixed-Effects Model Results: FHSP Enrollment

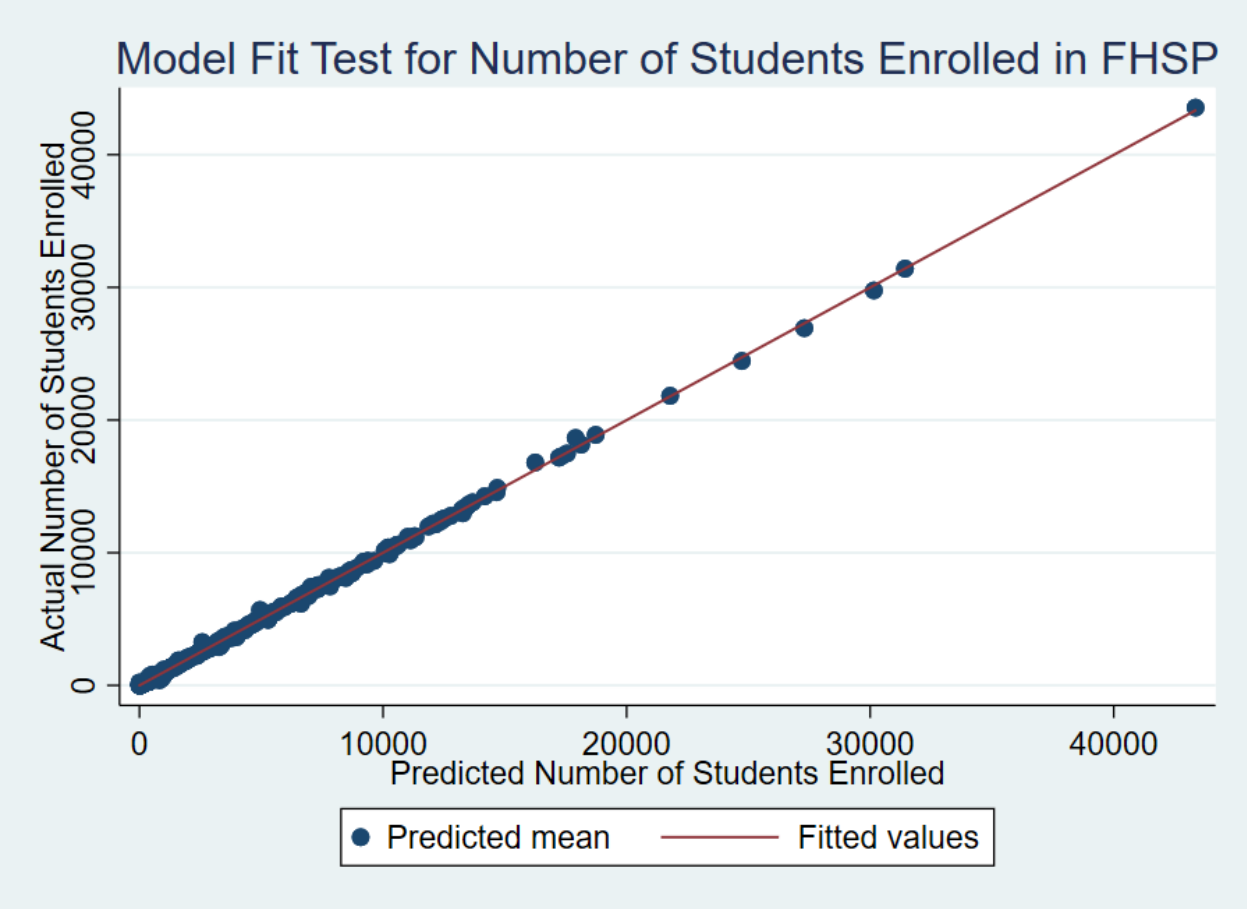
	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR	Model 6 OR	Model 7 OR	Model 8 OR	Model 9 OR	Model 10 OR
Enrolled in FHSP Fixed Effects										
Year			3.627*** (0.07)	3.264*** (0.10)	3.231*** (0.11)	3.113*** (0.13)	3.168*** (0.14)	3.139*** (0.17)	3.056*** (0.04)	3.281*** (0.11)
Urban (base)				1	1	1	1	1	1	1
Suburban				1.079 (0.08)	1.048 (0.08)	1.049 (0.08)	1.045 (0.08)	1.056 (0.08)	1.079 (0.09)	1.090 (0.09)
Rural				1.202* (0.10)	1.125 (0.09)	1.109 (0.10)	1.121 (0.10)	1.159 (0.12)	1.337** (0.13)	1.203* (0.11)
Year Interaction with Urban (base)				1 (.)	1 (.)	1 (.)	1 (.)	1 (.)	1 (.)	1 (.)
Year Interaction with Suburban				1.005 (0.04)	1.011 (0.04)	1.040 (0.05)	1.024 (0.05)	1.030 (0.05)	0.983 (0.02)	0.996 (0.04)
Year Interaction with Rural				1.184*** (0.05)	1.188*** (0.05)	1.235*** (0.07)	1.223*** (0.07)	1.252** (0.09)	1.112** (0.04)	1.180*** (0.05)
Percent African American/Black					0.991* (0.005)	0.991 (0.005)	0.989** (0.004)	0.991 (0.005)	0.989 (0.006)	0.991** (0.003)
Year interaction with Percent African American/Black					1.002 (0.003)	1.003 (0.004)	1.002 (0.003)	1.003 (0.004)	1.001 (0.001)	
Percent Hispanic/Latino						0.9998 (0.001)	0.9998 (0.001)	0.9994 (0.003)	1.004 (0.003)	1.003 (0.001)
Year interaction with Percent Hispanic/Latino						1.002 (0.001)	1.002 (0.001)	1.002 (0.002)		

Table 17, Cont.

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR	Model 6 OR	Model 7 OR	Model 8 OR	Model 9 OR	Model 10 OR
Percent Male							0.992 (0.01)	0.992 (0.01)	0.996 (0.008)	0.992 (0.01)
Year interaction with Percent Male							1.011 (.008)	1.011 (.008)	1.001 (0.007)	1.012 (0.008)
Percent Economically Disadvantaged								1.001 (0.004)		
Year interaction with Percent Economically Disadvantaged								1.0001 (0.003)		
Fixed-effects Intercept	1.818*** (0.14)	2.312* (0.81)	2.256*** (0.25)	2.202*** (0.27)	2.218*** (0.27)	2.151*** (0.25)	2.199*** (0.26)	2.216** (0.28)	2.153*** (0.21)	2.196*** (0.26)
Random-effects Intercept		18.03*** (3.02)	1.408*** (0.07)	1.404*** (0.07)	1.403*** (0.07)	1.425*** (0.08)	1.414*** (0.07)	1.406** (0.07)		1.410*** (0.07)
Random-effects Slope (Year)		0.641 (0.47)	0.985 (0.03)	0.989 (0.04)	0.985 (0.04)	1.007 (0.05)	0.989 (0.04)	0.979 (0.05)		0.989 (0.04)
Observations	2929	2929	2929	2929	2929	2929	2929	2929	2929	2929
AIC	819467.0	44033.6	42340.3	42251.5	42234.1	42229.2	42203.6	42216.9	66925.7	42196.9
BIC	819479.0	44057.5	42370.2	42305.4	42299.9	42306.9	42293.3	42318.6	66997.5	42274.7

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2: Model Fit Test for Number of Students Enrolled in FHSP



In addition to the enrollment response variable, I also fitted a model that would estimate the relationship between the graduates on the FHSP plan out of total graduates and the same predictor variables, also considering that any graduates before the class of 2018 are on the FHSP plan voluntarily. As 2015–2016 has the most reliable data, I will not use an MEM and consider time as a predictor, but rather a GLM that uses a logistic function as a link to consider the influence of the other variables on the number of graduates on FHSP in only this year.

First, I considered a model that only looked for influence of urbanicity on the number of graduates in districts on the FHSP plan. The test found that rural districts had statistically significant differences from urban and suburban graduates. Next, I tested a model that considered

urbanicity and the percent of a district's students who are African American/Black as a predictor, which did not show as significant but did have a better rated fit according to AIC and BIC, so I continued to consider it in the models. I tested several models with variables of percent of students in a district who are Hispanic/Latino and economically disadvantaged. These did not have a better fit or show any significant variables, so I excluded those variables from future models. Lastly, I fitted a model that considered the interaction of urbanicity and percent of African American/Black students. This model showed to be a better fit but did not introduce any significant differences based on the predictors, so to maintain parsimony I excluded percent African American/Black and the interaction from future models. Graduation data around percent of students who are male and female are not available, so that variable was not considered in these models.

The final model for graduates under FHSP in the year 2016 presents a constant of .067, which are the odds that at student at an average urban district would graduate on FHSP in 2016 and only considers urbanicity as a predictor. The odds that a student at the average suburban district graduated under the FHSP plan in 2016 are not statistically different than those of the urban student. However, the model shows that students in the average rural district were much more likely to graduate on the FHSP plan, with an increased in odds of 2.274, or an increase of 227.4%. Table 18 provides the odds ratios from each model.

Table 18: Generalized Linear Model Results: FHSP Graduation 2016

	Final Model OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR
Urban (Base)	1	1	1	1	1
Suburban	1.152 (0.28)	1.165 (0.28)	1.119 (0.28)	1.142 (0.28)	1.280 (0.36)
Rural	3.274*** (0.81)	3.085*** (0.78)	2.924*** (0.80)	3.053*** (0.77)	3.302*** (0.91)
Percent African American/Black		0.987 (0.007)	0.986 (0.007)	0.987 (0.007)	1.003 (0.01)
Percent Hispanic/Latino			0.998 (0.003)		
Percent Economically Disadvantaged				0.998 (0.004)	
Urban Interacted with Percent African American/Black					1
Suburban Interacted with Percent African American/Black					0.980 (0.02)
Rural Interacted with Percent African American/Black					0.972 (0.02)
Observations	971	971	971	971	971
AIC	66089.3	65620.6	65556.6	65596.4	65324.1
BIC	66103.9	65640.1	65581.0	65620.7	65353.4

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Enrollment and Graduation Distinguished Level Achievement

This study paid special attention to the question around student outcomes that render them eligible for university admission post graduation. As the distinguished level of achievement designation under FHSP mirrors the course work needed to apply to universities, I explored the relationships of the predictor variables of race, socioeconomics, and type of district to find out

how much those factors influence the enrollment or graduation under the distinguished achievement plan in FHSP plan to date. The STEM endorsement course requirements also meet the course requirements for university admission, but any student on the STEM endorsement also earns the course requirements for the distinguished level of achievement, so examining just the distinguished level enrollees and graduates considers the STEM students as well.

With multiple years of data around enrollment in the distinguished level of achievement and wanting to look for effects both within and between districts, I fitted a mixed-effects logit model to examine the relationship between the predictor variables and number of students who are enrolled in the distinguished level of achievement. First, I fitted the base model that only predicted the fixed-effects intercept and the variance of the random effects. The ICC of .702 suggested that the variation in outcomes is partially explained by the differences between districts. Next, I tested a model that included the year as an influencer through random effects, which did not converge. I proceeded to test several other models, all of which either did not converge, did not provide better fit, or provided no significant factors to consider.

As the multilevel models were not converging or fitting well, I fitted GLMs using a logistic function as the link for enrollment in the distinguished level of achievement. I created a model for each year and for the predictors of urbanicity, percent of students who are African American/Black, percent of students who are Hispanic/Latino, percent of students who are economically disadvantaged, percent of students who have limited English proficiency, and percent male. No model showed that any of these predictors had a statistically significant influence on the outcomes of which students enrolled in the distinguished level of achievement in the years for which there are data. Table 19 provides the odds ratios from each model for 2017 as examples.

Table 19: Generalized Linear Model Results: FHSP Distinguished Enrollment 2017

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR	Model 6 OR
Urban (Base)	1					
Suburban	0.715 (0.257)					
Rural	0.723 (0.226)					
Percent LEP		0.859 (0.08)				
Percent Hispanic/Latino			0.997 (0.005)			
Percent African American/Black				0.986 (0.011)		
Percent Economically Disadvantaged					0.991 (0.007)	
Percent Male						0.943 (0.04)
Observations	974	974	974	974	974	974
AIC	761886.6	756568.6	766677.5	760569.2	758418.7	765742.1
BIC	761901.2	756578.3	766687.3	760579.0	758428.5	765751.9

Exponentiated coefficients; Standard errors in parentheses
$^{\cdot}\ p < 0.05, ^{\cdot\cdot}\ p < 0.01, ^{\cdot\cdot\cdot}\ p < 0.001$

I also fitted a model that would estimate the relationship between the graduates on the FHSP plan out of total graduates and the same predictor variables. As the only reliable data available are for 2015–2016, I employed a GLM that uses a logistic function as a link to consider the influence of the independent variables on the response variable. First, I fitted a model that only considered urbanicity as a predictor—it showed that districts with the status of being an rural district had a statistically significant difference than urban districts. Next, I fitted a model that considered both urbanicity and percent of students in the district who are African American/Black. This model had lower AIC and BIC scores, indicating better fit to the data, and showed that the rural district status and percent African American/Black were significant factors in a student being in the distinguished plan under FHSP. I tested a variety of models that

included urbanicity and percent African American/Black and variables of the percent of students in a district who are Hispanic/Latino and economically disadvantaged as well as interactions between them. They all had either very similar or higher AIC and BIC scores, indicating comparable or inferior fit to the data. None introduced new significance to consider, so percent Hispanic/Latino and economically disadvantaged were excluded from future models. Finally, I tried a model that considered predictors of urbanicity and percent African American/Black as well as the interaction between them. This model had the lowest AIC and BIC scores, indicating it was the model of best fit. The district status of rural was a statistically significant factor, as was the interaction between suburban districts and percent black. Table 20 for the odds ratios and standard error for each term.

Table 20: Generalized Linear Model Results: FHSP Distinguished Graduation 2016

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Final Model OR
Urban (Base)	1	1	1	1	1
Suburban	1.021 (0.43)	0.930 (0.39)	0.891 (0.39)	0.975 (0.40)	1.129 (0.52)
Rural	3.681*** (1.34)	2.693* (1.05)	2.552* (1.04)	2.636* (1.01)	3.228** (1.34)
Percent African American/Black		0.948*** (0.01)	0.946*** (0.01)	0.945*** (0.01)	0.977 (0.02)
Percent Hispanic/Latino			0.997 (0.005)		
Percent Economically Disadvantaged				1.011 (0.006)	
Urban Interacted with Percent African American/Black (Base)					1
Suburban Interacted with Percent African American/Black					0.922* (0.03)
Rural Interacted with Percent African American/Black					1.019 (0.03)
Observations	571	571	571	571	571
AIC	16776.9	15333.5	15303.4	15125.7	14570.3
BIC	16789.9	15350.8	15325.1	15147.4	14596.4

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This model provided a constant term of .73, denoting that the odds of a student in an average urban district with the average percent of African American/Black students graduating in 2016 was .73, or nearly three quarters. For districts with the status of rural, the odds ratio estimated by the model is 3.22. This indicates that a student in a rural district had an increase in the odds of graduating with the distinguished level of achievement but 2.23, or more than 200 percent as compared to the student in the urban district. For African American/Black students in suburban districts, the odds ratio estimated by the model is 0.922. This means that for each percentage point increase in the African American/Black students in a suburban district, the odds

of a student graduating with the distinguished level of achievement are predicted to decrease by .078 on average as compared to a student in an average urban district. This is a particularly noteworthy finding that is discussed in Chapter 6.

Chapter Summary

In this chapter I discussed the inferential statistics that resulted from the use of models that measure the relationships between the predictor variables of racial and socioeconomic composition of the district as well as the type of district. These statistics showed that there are statistically significant differences in the total number of endorsement offerings of each district and the offering of the STEM, Arts and Humanities, Public Services, and Business and Industry endorsements across urbanicities and years. The statistical tests showed that there were statistically significant differences in enrollment in the FHSP plans rather than the previous plans based on year, urbanicity, and percent of student in the district who are African American/Black and Hispanic/Latino. Of those tested, the models found no statistically significant predictor variables on the enrollment of students in the distinguished level of achievement across the years or in single years to consider. Finally, the models found that there were statistically significant differences between the graduates on FHSP in 2016 based on urbanicity and the percent of students in the suburban districts who are African American/Black. Chapter 6 provides discussion of these results and remaining questions for future studies moving forward as HB 5 goes to full implementation across high school grade levels.

CHAPTER 6

Discussion

Introduction

In 2013, Texas policymakers introduced HB 5 and put into place a multitiered set of graduation plans, called FHSP, from which students choose their educational pathway in high school. This hierarchical set of graduation plans groups students based on their chosen career endorsement and offers different content instruction based on their choices. The plans under FHSP mirror tracking structures that have been widely defined by categorizing students into groups and then providing those groups with dissimilar instructional experiences. This project investigated whether HB 5 is effectively offering students more flexibility and choice or if the policy functionally operates as tracking sending some students into lower track plans that limit their postsecondary choices. The study tested the hypothesis that a disproportionate number of minority and poor students are offered, placed in, and graduate on lower tracks that do not render them eligible for university admission after graduation while White and wealthier students make up a greater proportion of those in higher tracks under FHSP introduced by HB 5. In this chapter, the study is first revisited, including the literature review, methods, and findings. Then, sections follow that provide a general discussion of findings, specific discussion of each finding and concluding discussions, suggestions of topics for future research, and implications for policy.

Context of Study

A review of the literature available about the impact of tracking on student opportunity and outcomes in secondary schools shows that tracking impedes student achievement and lowers ambitions for students in low and average tracks. The scholarship also shows direct effects of social class and minority status on track assignments, with poor and minority students

represented in lower tracks at much higher rates than their White and wealthy peers. Supporters of HB 5 supposed that it would not reflect these negative effects due to the focus of student choice in their ascribed course of study. However, researchers find that even when student choice is the primary deciding factor in track placement, their choices are overshadowed and student ambitions are undermined by the institutional arrangements in schools. Therefore, even though the main sorting process under HB 5 is student choice of graduation plans, research indicates that this policy has the potential to replicate existing inequitable social structures and result in disparate outcomes between racial and economic groups, reifying social stratification.

The scholarship around tracking is extensive—there is a great amount of evidence that multitiered, hierarchical courses of study provide little to no benefit for students in the high tracks and negatively impact students in average and low tracks. However, as more modern structures evolve, investigations must be performed to determine if the outcomes of these new structures mirror those of the previous research around tracking. HB 5 introduced a set of graduation plans, including four endorsements that do not prepare students to a level that meets the admissions requirements of most universities in Texas and only one endorsement that prepares students for university-level study after graduating from K–12.

This investigation of the HB 5 offerings and outcomes expands the evidence pool to include the impacts of this particular policy in Texas. As mentioned in Chapter 1, Anderson and Oakes (2014) expressed concerns specifically about HB 5 introducing a tiered diploma system that funnels some freshmen into a high-track and distinguished diploma, others a low-track foundational diploma, and still others to average tracks and career endorsements in between. In reference to HB 5 in Texas and other similar new laws in other states, they said, “It remains to be seen what these resurgent practices and new systems will yield, decades of research indicate the

strong potential for such approaches to further imperil equality and opportunity" (Anderson & Oakes, 2014, p. 112). In light of the research around the influence schools have on student choice of tracks and the limited means for students and their parents to gain information about their choices, there are also concerns that Texas students never actually experience true informed choice about their educational options while in high school.

This study is important because growing the evidence base to include current contexts, motivations, and approaches to implementing school structures increases the relevance of the scholarship on this topic. The specific research questions for the study were as follows:

1. Are there patterns in the endorsement plans school Texas districts offer based on the type of community the district serves (including urban, suburban, and rural) or the racial and socioeconomic distribution of the student population served by the district?
2. Are there patterns in the students enrolling and completing different HB 5 graduation plans and specifically differences between those that render students eligible for admission to a university upon graduation versus those that do not, based on the type of community the district serves (including urban, suburban, and rural) or racial or socioeconomic composition of the student population at the district?

This study used a quantitative analysis of the administrative data available through TEA to look for descriptive patterns in the offerings and outcomes for students. Generalized multilevel linear models estimate the extent of relationships, or the lack thereof, between both the HB 5 graduation plan offerings in each district and outcomes for students enrolling and graduating under the HB 5 plans and the district's characteristics. The predictor variables of interest are the type of or urbanicity of the district and the racial and socioeconomic composition of each district.

Review of Methods

The study used descriptive statistics to examine the offerings and outcomes of the HB 5 graduation plans across years since its implementation in 2014. The descriptive statistics include summary measures about the data for the entire population as well as disaggregated by urbanicity of the district and subgroups of students. These observations contributed to building a strong understanding of the impacts of the HB 5 graduation plans, which helped frame the context of the study and make decisions about the parameters to consider in the inferential statistical tests.

Inferential statistical analysis employed allowed for analysis of relationships and patterns in the data and measurement of those relationships. To explore the relationships between racial and socioeconomic makeup of a district and the type of district as predictors of the total number of endorsement offerings of each district, I fitted a mixed-effects Poisson model. I used mixed-effects logit models to examine the relationship between those same predictors and the offering of each endorsement in districts across the state. I fitted a mixed-effects logit model to examine the relationship between the predictors and the enrollment into the FHSP plans during the years when enrollment was optional. I tried the same for enrollment in the distinguished level of achievement, but the models did not converge, indicating that enrollment predictors do not vary randomly between districts. Thus, I utilized a logistic regression model. I used the same type of model to fit the data around graduation under FHSP and graduation under the distinguished level of achievement in 2016.

Summary of Findings

The descriptive data in Chapter 4 painted a picture that highlighted differences in offerings of endorsements under FHSP. Rural districts offered fewer endorsements across all years than their urban and suburban counterparts. While the proportion of rural districts that

offered the Multidisciplinary and Business and Industry endorsements was similar to urban and suburban districts in the last year covered in the study, they fell short on the proportions offering the STEM, Arts and Humanities, and Public Services endorsements in comparison across all years.

The mean enrollment in the FHSP plans grew steadily over the years of implementation in all districts, as would be expected due to the requirement for incoming classes to enroll under FHSP starting in 2014. The proportions of African American/Black students and LEP students enrolled were higher than other student subgroups in each year of implementation, with a mean of 100 percent of these students in these groups enrolled under FHSP in 2016–2017. Other subgroups of students still had more than 10 percent of their populations on the 4x4 graduation plan during this year. The FHSP enrollees were not evenly spread across endorsements, with more than 50 percent of them enrolled in either the Multidisciplinary and Business and Industry endorsements in 2015–2016 and 2016–2017. Less than 10 percent of students across the state in 2016–2017 were in each of the Arts and Humanities, Public Services, and STEM endorsements. About 25 percent of students were in a combination of endorsements, with about 40 percent of those students including STEM as one of their pathways.

The graduates on the FHSP plan in 2015 and 2016 showed similar patterns to the enrollment patterns in FHSP, with a much higher percentage of FHSP graduates being African American/Black and LEP than from other subgroups of students. The medians across the state were much lower than the means for African American/Black and LEP students, which indicates there were fewer districts graduating students under these plans, but those districts with graduates on the FHSP plan had a large proportion of their students on these plans.

The mean proportion FHSP enrollees on distinguished level of achievement in each district at the state level was about 63 percent per district in 2016–2017, the last year of this study and the third year of implementation of FHSP. The distinguished level of achievement under FHSP requires students take the coursework that meets the requirements for admission to state universities in Texas. Under the 4x4 graduation plan in place before FHSP, the proportion of students graduating on the Recommended plan with similar course work was above 80 percent and as high as 85 percent in the several years before HB 5 passed and implementation of the FHSP plans started. This represents a drop of nearly 20 percentage points—the implementation of the FHSP plans, intended to provide students with more choice in their high school course of study, have pushed the choice of university study out of reach for nearly a quarter of students who would have had that choice among their postsecondary options if they were enrolled or graduated under the 4x4 plan. While some students had moved to the FHSP plan in 2016, the proportions of 2016 graduates who were on the Recommended and Distinguished plans under the 4x4 were still at about 85 percent.

The descriptive statistics indicate that rural districts had a much higher proportion of students who graduated under the FHSP plan earning the distinguished level of achievement in 2016 than their urban and suburban counterparts. This may be a case where a large number of masked values due to small numbers in each subgroup in rural districts with already small proportions of students graduating on this plan caused inflation in numbers, as the number of students enrolled in the distinguished level of achievement in rural districts is not higher. In fact, rural districts have the lowest mean of the three urbanicities at 62 percent, while suburban and urban districts had 66 percent and 70 percent of their FHSP students enrolled in the distinguished level of achievement in these same years. It may also be that rural districts had

students who were on track to graduate on the Recommended plan under the 4x4graduation policy move to the FHSP plan just for graduation because the same course requirements would earn them the higher distinction of the distinguished level of achievement on the new plan.

Chapter 5 showed that there are statistically significant differences in the total number of endorsement offerings of each district and the offering of the STEM, Arts and Humanities, and Public Services endorsements across urbanicities and years. Rural districts offer significantly fewer endorsements, with a mean of about 4 as compared to the urban and suburban mean of 5. As for the offerings of individual endorsements, rural districts are offering the STEM, Arts and Humanities, and Public Services endorsements less often. While each year districts across the state increase their offerings, rural districts are increasing these three offerings at a significantly slower rate per year than their urban and suburban counterparts as well. This indicates they have fewer offerings and are falling further behind.

The first research question of this study was, "Are there patterns in the endorsement plans Texas school districts offer based on the type of community the district serves (including urban, suburban, and rural) or the racial and socioeconomic distribution of the student population served by the district?" Both the descriptive and inferential analyses provide evidence that the answer is *yes, there are patterns in offerings of endorsements that show statistically significant differences between rural districts and urban and suburban districts*. These patterns show that rural districts offered significantly fewer total endorsements in 2014–2015 and continued to do so in 2016–2017. Rural districts offered the STEM, Arts and Humanities, and Public Services endorsements less often in 2014–2015 and increased the offering of these endorsements at significantly slower rates than urban and suburban districts over the next two academic years. The study did not find statistically significant influences in the endorsement offerings of districts based on the racial

and socioeconomic distribution of the student population served by the district, past those differences that are inherent in their urbanicity, in the years examined.

The tests showed that there were statistically significant differences in enrollment in the FHSP plans based on year, urbanicity, and percent of students in the district who are African American/Black and Hispanic/Latino. The finding of differences by year is expected, as a new class of freshmen each year is required to enroll under the new plans. However, findings of significant differences by urbanicity and by district ethnic composition is interesting and important to study. The model shows that students in typical rural districts in 2014–2015 had a predicted increase in odds of 20 percent of being enrolled in the FHSP plan than students in an average urban district. Each year after that, the predicted odds of a student in a rural district being enrolled in FHSP increased by 18 percent on average more than those in urban districts. In addition, for each increase in the percent of African American/Black students in a district, the predicted chance that a student would be enrolled in the FHSP plan decreased by .9 percent, while for each increase in the percent of Hispanic/Latino students in the district the predicted chances a student would be enrolled in FHSP was increased by .3 percent. The finding of students in districts with larger African American/Black populations having a significantly lower chance of being enrolled in FHSP seems inconsistent with the descriptive statistics that showed the African American/Black subgroup being enrolled at a higher rate than any other subgroup of students, with the exception of LEP students. Some factors that might influence this are that rural districts enrolled students in FHSP at significantly higher rates than urban districts, and they have on average half of the African American/Black population proportion that urban districts have. Also, as noted previously, the median proportion of a district's African American/Black population enrolling in FHSP was much lower than the mean, indicating that there are a greater

number of districts enrolling lower proportions of African American/Black students and fewer districts enrolling at high proportions—those districts have high enough proportions that the mean is skewed upward. These indicate that the descriptive statistics might show the subgroup of African American/Black students being enrolled at a higher rate than other populations while also indicating that the increase of proportion of African American/Black students in a district would decrease the chances of any student in that district being enrolled in FHSP. The finding that an increase in the proportion of a district's student body that is Hispanic/Latino increases the chances that a student in that district is enrolled in FHSP is noteworthy as well. Urban and suburban districts have a higher proportion of Hispanic/Latino students, but enrolled students at a slower rate than rural districts who have lower proportions of Hispanic/Latino students. This indicates a specific relationship between students who are Hispanic/Latino being moved at a higher rate than others.

The statistical models estimated show no significant differences in the enrollment of students in the distinguished level of achievement of those who were enrolled in the FHSP plans. Since each year of this study increased the proportion of students enrolled in FHSP but still allowed some students the option of being on the 4x4 plan, students who might have enrolled in the distinguished level of achievement under FHSP may have elected to stay on the 4x4 plan instead. This self-selection out of the FHSP plan could cause a selection bias in the data that interferes with any patterns that might show if enrollment was mandatory and there was not another choice. The data about enrollment on the FHSP distinguished level of achievement starting in 2017–2018, when HB 5 plans have reached full implementation across all grade levels, will provide a complete dataset in which patterns may emerge more clearly. The graduation data for 2016 does not show a higher proportion of students graduating on the

Recommended and Distinguished plans of those who stayed on the 4x4, so there is not an indication that the proportion of students enrolled on the distinguished level of achievement will rise higher than it is now when all students are on the FHSP plan.

The tests showed that there were statistically significant differences between the graduates on FHSP in 2016 based on urbanicity and the percent of students in suburban districts who are African American/Black. The models show that a student in an average rural district was more than 200 percent more likely to graduate on the Distinguished plan than a student in an urban district the same year. The enrollment and graduation in FHSP were higher in rural districts; of those students who graduated on FHSP, there was a 200 percent higher chance that a student was on the Distinguished plan in rural districts than in urban or suburban districts. The model also showed that in suburban districts, an increase of the percent African American/Black in the population of the district means the predicted chances of an FHSP student graduating on the distinguished plan in 2016 decreased dramatically, by 7.8% on average, as compared to their counterparts in urban districts. This model demonstrates that suburban schools with high proportions of African American/Black students had many fewer students enrolled on the Distinguished plan of those moved to the FHSP plan.

The second research question of this study was, "Are there patterns in the students enrolling and completing different HB 5 graduation plans and specifically differences between those that render students eligible for admission to a university upon graduation versus those that do not, based on the type of community the district serves (including urban, suburban, and rural) or racial or socioeconomic composition of the student population at the district?" The evidence shows that the answer to this question is *yes, there are patterns in the enrollment and graduation data for students under the FHSP plan and patterns in the proportion of students enrolled and*

graduating on plans that render them eligible for university admission upon graduation. The data analysis shows that rural districts had significantly higher enrollment and graduation of students in the FHSP plan versus the previous 4x4 plan in years where FHSP enrollment was optional. It also showed significant differences in the enrollment in the FHSP plan by districts based on the proportion of the students served in that district who are African American/Black and Hispanic/Latino. While there are no patterns with statistical significance that emerge in the enrollment of students in the distinguished level of achievement in the current data, there are patterns in the graduation data around students who are graduating with the distinguished level of achievement out of those graduating under FHSP. The analysis shows that students in a rural district has a significantly higher chance of graduating with the distinguished level of achievement if they are graduating on the FHSP plan than students in an urban and suburban district in the same situation. Most strikingly, the analysis showed that an increase of the proportion of African American/Black students enrolled in a suburban district decreases the predicted chances of a student in that district graduating on the distinguished plan.

General Discussion

Before moving into discussion of specific implications of this study, it is necessary to present some general discussion of the study and its context to frame the implications. First, this study is of the initial data around implementation of a policy. Beginning implementation does not necessarily represent what would happen in the future as the policy implementation continues to full stages. However, such analyses are important to demonstrate current and emerging trends; if implementation continues on the same course, the findings may hold or grow over time. The analysis of the data for enrollment in FHSP is only applicable to the years in this study when some students had the choice to enroll under the new or old plans. Beginning in

2017–2018, all students enrolling in high school for the first time are required to enroll under the FHSP plans—an investigation of who is enrolled becomes moot for those years. However, this initial question of the speed of movement of students in the initial years is important given the rhetoric of the HB 5 bill as it was being drafted and considered in the Texas Legislature.

This study about offerings and outcomes of a system consisting of a hierarchical set of graduation plans found some trends that are in line with previous studies discussed in the literature review and some trends that differ. It is possible that different or additional patterns in future studies may emerge that are not represented in this study due to the nascent implementation of the policy. The data analysis in the study demonstrated that in some instances racial composition was an influence on the outcomes of HB 5 graduation plans of a district's students. However, it is most important to note that urbanicity is consistently an important predictor of offerings and outcomes. Specifically, the offerings and outcomes of rural districts show to have many significant differences from their urban and suburban counterparts. These findings indicate that something is happening in rural districts that needs to be considered carefully.

Bauch (2001) and Budge (2006) stated in their respective studies in rural communities that it is hard to define a set of characteristics describing all rural settings; yet, there are some commonalities across the groups. Budge noted that rural communities are smaller than others and have low population density. Bauch argued that rural communities have a higher proportion of low-wage jobs that often depend on manual labor, higher poverty rates, and generally lower formal educational achievement levels than urban communities. She also found that fewer students in rural communities aspire to go to college and college-preparatory-level course work because typically "the local occupational structure seems not to reward it" (Bauch, 2001, p. 209).

Students in rural communities are most often exposed to jobs that do not require college-level preparation or advanced studies in high school. Bauch indicates that high school students in rural schools are typically more interested in getting a diploma than in what they actually learn in school.

Specifically considering differences in schools in rural areas, Bauch (2001) said rural schools and districts are more often underfunded due to lower property values, provide fewer course offerings and programs, and are slower to implement new technology than nonrural schools. Teachers in rural schools are "younger and less experienced than their urban school counterparts, have less professional preparation, are paid less, and have fewer benefits" (p. 210). She observed that rural districts also have trouble recruiting teachers. The Institute of Education Sciences (2008) found that rural districts have long struggled with finding qualified teachers, but that the No Child Left Behind (NCLB) Act of 2001 introduced a new standard for qualification that was particularly hard to meet in rural districts. Teachers in rural districts often teach multiple content areas due to the limited number of faculty members, and NCLB requires that each teacher meet the standard of "highly qualified" in each content area they teach. Even if teachers were willing to take additional courses needed to meet the NCLB standard across multiple content areas, it was often more difficult to gain access to the needed coursework in rural communities.

Another specific difference between rural districts and others that both Budge and Bauch note is the isolation of the community, which prevents rural students from building a larger world view and seeing what exists beyond the boundaries of their everyday lives within a small community. Budge (2006) indicated that geographic and social isolation limit the quality and quantity of experiences students need. Bauch (2001) observed that this isolation limits rural

students' ability and opportunity to make knowledgeable choices about where they wish to live and work in the future, confining themselves to what is known. Both authors indicated that students in rural communities feel particularly strong ties to their schools and communities, and students can be reluctant to leave for higher education or employment opportunities in their postsecondary endeavors. Budge (2006) noted that her study found that students in rural districts were "viewed as apathetic and having limited aspirations, which was at least partially due to students questioning the relevancy of education to their lives" (p. 4). Rural students have a harder time staying engaged with school if they do not anticipate the specific benefits of that education for themselves within their rural community.

Perhaps the amplified need for relevancy in coursework in rural areas is why rural high school students take more credits of career and technical education (CTE) in high school than urban or suburban students (Association for Career and Technical Education [ACTE], 2015). According to ACTE, CTE is particularly adept at engaging students in rural areas, which is, as Budge and Bauch noted, where more students have trouble connecting educational experiences to their desires for future employment. While more academic programs or course pathways might suffer in rural districts from a smaller school faculty with limited certifications, CTE studies have effectively overcome challenges like these in rural districts by providing access to courses through a CTE Center model (ACTE, 2015). This model offers courses at a centralized location to multiple districts and allows districts to share resources (e.g., equipment and highly qualified teachers for each CTE course). As this model mitigates the effects of isolation that might have otherwise prevented the offering of these courses in rural districts and allows these students to take courses they feel better connect to their aspirations to support and live in their

communities, this might be a model that could also increase access to FHSP endorsements to students across rural districts as well.

Discussion: Analysis of Endorsement Offerings Data

A significant finding from the study is the minimum value of the total endorsement offering variable for suburban and rural districts was 0 in the 2016–2017 academic year. As the definition of that variable in the study was the number of endorsements in which at least one student was enrolled in that district, this finding says there were rural and suburban districts in the academic year 2016–2017 that had no students enrolled in any endorsement under FHSP. HB 5 mandates that students entering high school as freshmen in 2014, 2015, and 2016 enroll under FHSP with an endorsement. The bill specified that students are allowed to choose to move to the Foundation plan and not have an endorsement in their junior year with the consent of parents and the school and after being warned of the possible consequences of that move (TASA HB 5 Summary, n.d.). However, every district in the state should have had all freshmen and sophomores in the 2016–2017 academic year enrolled under FHSP and in an endorsement. The mean of the proportion of students enrolled under FHSP with no endorsement across the state and in all urbanicity levels in 2016–2017 was about .08. The maximum proportion of students in a district enrolled in FHSP with no endorsement in a district was 1, indicating that some schools enrolled students on the FHSP plan without enrolling them in an endorsement. This indicates students are enrolled directly into the Foundation plan and will only be required to earn 22 credits to graduate from high school; they are not on track to earn the advanced courses they are required by law to take under an endorsement. The policy clearly indicates that all students entering high school must have an endorsement for their freshmen and sophomore years starting

with enrollees in 2014 and only permits moving to the Foundation plan during their third year of high school with informed permission from their parent and the school.

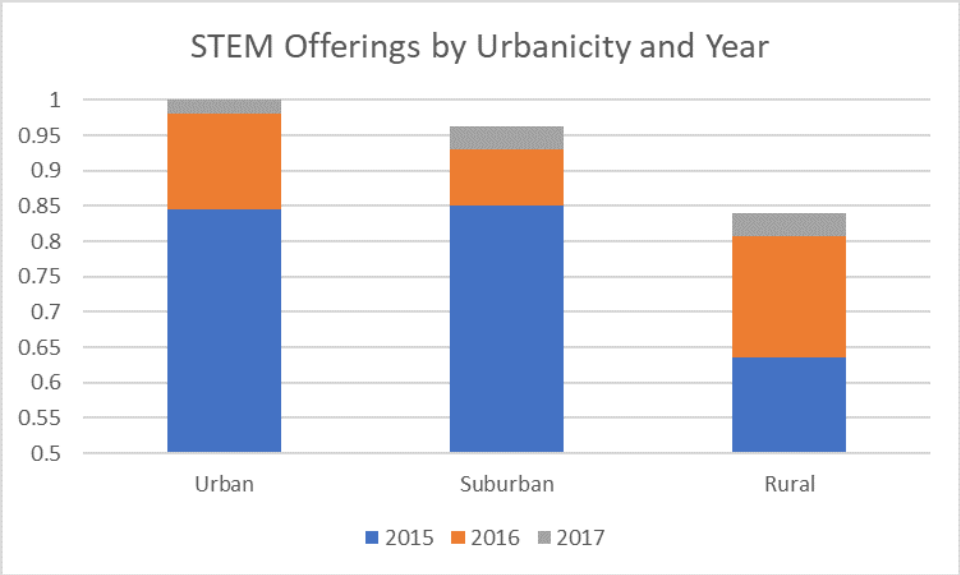
The study found that the year was a significant influencer on whether districts offered each endorsement, showing that for each year after 2014–2015 the endorsements were all more likely to be offered in districts across the state. This finding was expected. As this study is looking at the beginning years of implementation, districts likely started with offering as many endorsements as they could in the first year and extended their offerings over time. The maximum possible value for a district's total offering is five endorsements, and at least half of the districts across the state at all levels of urbanicity were offering all five endorsements as of the 2016–2017 academic year. I would expect to see some more growth in the mean of total offerings, but as urban and suburban districts already have a mean very close to the maximum of 5, the type of district with the most room for growth in total offerings is in rural districts. It remains to be seen if rural districts would ever increase to have a similar mean number of endorsements to what urban and suburban districts are offering their students.

This leads to discussion of the second important finding, which is that rural districts are offering their students fewer endorsements than their suburban and urban counterparts. This finding was anticipated in the hypotheses of the study. It also verifies previous research findings that rural districts generally offer fewer courses and special programs. As rural schools are smaller and have fewer students and teachers, offering a wide array of course work that would then allow offering of all endorsements is and will remain a challenge in their context. This means that students in those rural districts are limited on their choices for how to tailor their course of study in high school, while the expressed intent of the lawmakers who passed HB 5 was to ensure that all students were able to choose their course of study based on their ambitions.

Specifically, the study found that while urban districts had a mean total offering of 100 percent of districts offering every endorsement, many rural districts offered significantly fewer endorsements. Rural schools offered all endorsements other than the Multidisciplinary endorsement in 2014–2015 less often than urban districts. This includes the STEM, Arts and Humanities, Public Services, and Business and Industry endorsements. The study also found that as the years progress, rural districts were slower to expand to offering the STEM, Arts and Humanities, and Public Services endorsements.

As Budge (2006) and Bauch (2001) indicated, students in rural districts tend to limit themselves to the narrow field of career choices they have seen and know well within their rural communities. In 2017, only 84 percent of rural districts offered the STEM endorsement (Figure 3). A possible reason for the low offering of STEM in the rural districts is limited access to qualified teachers for varied advanced math and science courses and to the supplies and equipment needed to effectively offer a range of higher level mathematics and science courses. As Bauch noted, rural districts are more likely to be underfunded and less likely to find highly qualified teachers in all content areas. The National Alliance for Partnerships in Equity (n.d.) indicated that the workforce in science and engineering has sustained growth for more than 50 years, and career fields outside of STEM need workers trained in STEM and related content. Yet, the STEM endorsement is not offered in all districts.

Figure 3: Proportion of Districts Offering STEM Endorsement by Urbanicity and Year



Data obtained from Texas Education Agency (n.d.c, r, af)

The low number of rural districts offering the Public Services endorsement is also troubling and may also be due to the lack of qualified teachers in these areas and lack of funding for equipment and supplies needed. The careers that are associated with this pathway include teaching, health science and nursing, and law and public safety. The American Nurses Association website (n.d.) indicates there is currently a nursing shortage that is getting worse, not better. NBC (2017) recently ran a story about a police shortage across the country that affects small towns as much as big cities. And as Bauch mentioned, rural districts have a hard time recruiting qualified teachers. The figures all point to these career pathways as providing great opportunity for students who grew up in and want to remain in their rural communities as well as offering them training that could take them out of those small towns. However, in 2017, this was the least offered endorsement, with only 69 percent of rural districts offering the Public Services endorsement.

It might seem understandable for rural districts to leave out the Arts and Humanities endorsement (which is related to careers in the fields of art, dance, and music) due to fewer opportunities for employment in these areas. However, the endorsement includes careers related to history, social studies, and languages other than English that would be applicable in these areas. This endorsement was only offered in about 80 percent of districts. Rural districts offered Business and Industry significantly less than urban districts in 2014, but they have been expanding to include this endorsement faster than the others over the remaining years in the study. This should be expected due to the career associations of agriculture, construction, and manufacturing included in this endorsement that are highly present in rural contexts. This endorsement also presents course requirements that include at least four CTE courses; therefore, rural students might be more apt to choose that endorsement.

The fact that rural districts are offering the Multidisciplinary and the Business and Industry endorsements in later years at similar rates to urban and suburban districts but offering the STEM, Arts and Humanities, and Public Services endorsements at significantly lower rates may be reifying the issues around limiting student career choices to what is known in rural communities. The expressed intent of lawmakers who passed HB 5 was to provide students with more flexibility and choice in their education to more closely tailor their studies to their career choices ("House Bill 5 Empowers Students," n.d.). The limited endorsement choices offered in rural districts is not helping students learn more and expanding their world view or offering them the ability to achieve a wider variety of postsecondary options. The multidisciplinary endorsement does not tailor students' study but allows for a wide variety of coursework to be bundled together to meet total requirements for the endorsement. Rural districts offer it more often than any other endorsement. The frequency of the Multidisciplinary endorsement offering

in rural districts indicates that students are not getting the focused study expected and therefore are not building their education toward their chosen career pathway. The previous 4x4 graduation plans were ousted due to their lack of specificity and general coursework, but now the most often offered pathway is a general course of study that has lower expectations for the coursework a student completes. This endorsement leaves them without a tailored set of coursework and without the courses needed to be rendered eligible for admission to a university.

The data did not show patterns in the total number of endorsement offerings or the individual endorsement offerings based on the composition of the district population, specifically looking at the percent of students in a district who are African American/Black and Hispanic/Latino as well as the percent of economically disadvantaged students. While there are differences in these aspects of the composition of districts between urban, suburban, and rural, the patterns in offerings were attributed to the urbanicity of the district and not those individual features. The hypothesis presented in the study was that suburban would offer the most endorsements and that there would be variation in offerings across urban districts. Urban districts offered a mean of 4.98 endorsements in 2016–2017 and suburban districts offered a mean of 4.83 endorsements. Urban districts had a slightly higher mean, but there is not a statistically significant difference between them.

Discussion: Analysis of Enrollment and Graduation in FHSP Data

For the years covered in this study, enrollment in FHSP was optional for at least some students, so it is important to examine the patterns in enrollment by the type of district and by the composition of the district population. As seen in the data around endorsement offerings, the year was a significant predictor of enrollment in FHSP. Again, as incoming classes were required to enroll in FHSP and in an endorsement, it is anticipated that each year would bring a significant

increase in student enrollment in both FHSP and the individual endorsement choices. The mean proportion of students enrolled in high school who were under the FHSP plans at the state level was .348 in 2014–2015, .628 in 2015–2016, and .837 in 2016–2017. These numbers might be expected, with each entering class being required to enroll under FHSP plus some students who were already enrolled choosing to switch to the new plans. In 2017–2018, I would expect the mean proportion of enrollment on FHSP to be near 100 percent.

The minimum proportion for student enrollment in FHSP was 0 and the maximum proportion was 1 for every student subgroup examined in each year of this study, including African American/Black, Hispanic/Latino, and economically disadvantaged students. This means there were schools who had no students from these subgroups on the FHSP plan and there were schools who had all students in these subgroups on the FHSP plan in each year covered by the study. Of the subgroups examined, African American/Black students have the highest mean enrollment in FHSP of any subgroups. They also have a median enrollment proportion of 1, which implies that more than half of the districts have all of their African American/Black students enrolled under FHSP. Though outside of the study focus, it is interesting to note that LEP students were enrolled at a much higher rate than other subgroups, with means of .57, .79, and .98 in 2014–2015, 2015–2016, and 2016–2017, respectively.

In line with the patterns seen in the endorsement offerings by districts, there are patterns in enrollment in FHSP endorsements. The endorsement with the most students enrolled is Multidisciplinary, while Public Services, STEM, and Arts and Humanities have the smallest proportion of students enrolled in FHSP. A potential reason for the prevalence of the Multidisciplinary enrollment is that it has fewer specific course requirements. This endorsement requires students take additional credits and advanced courses in on top of the requirements of

the Foundation plan, but allows students to take courses from multiple endorsements to meet those requirements. This may be a beneficial flexibility to students who have multiple interests or change their minds about an endorsement later in their high school career, but also may provide a district with a way to ensure students get enough credits to graduate with an endorsement without offering a complete set of courses under other endorsements. Again, this endorsement does not provide students with a tailored set of coursework for a particular career and also leaves them without the courses required to be rendered eligible for admission to a university.

The Business and Industry endorsement has the next highest proportion of enrollment of those students on the FHSP plan. A possible reason for this is the wide variety of careers aligned with this endorsement. The Austin Independent School District informational webpage about the Business and Industry endorsement (2013) lists the following career clusters: agriculture, food and natural resources, architecture and construction arts, audio/video technology and communications, business management and administration, finance, hospitality and tourism, information technology, manufacturing, marketing, and transportation, distribution, and logistics. This is the broadest pathway available after the Multidisciplinary endorsement. In addition, as mentioned previously, many of these career options are those that students in rural districts are more likely to see and have experience with, though the endorsement is also broad enough to apply in suburban and urban areas as well.

The STEM endorsement had low enrollment in 2016–2017 at a mean enrollment proportion in each district of only 7.7 percent of students enrolled in FHSP. A potential reason for the low enrollment proportions in STEM is the requirement for advanced mathematics and science. STEM is the only endorsement that requires students to take Algebra II; it also requires

students to take either additional advanced mathematics with Algebra II as a prerequisite or Physics, Chemistry, and then other advanced science courses. These courses in particular were at the center of the debate about graduation requirements when HB 5 passed. Algebra II, Physics, and Chemistry were all required on the 4x4 graduation plans and are now only required for students on the STEM endorsement. As mentioned previously, to be eligible for the Top 10% Rule students must earn an Algebra II credit, and all state universities in Texas either require or highly recommend Algebra II, Physics, and Chemistry credits for potential students.

The Public Services endorsement and the Arts and Humanities endorsement enrollments have the lowest enrollment proportions across the state, at 6.9 percent and 5.1 percent, respectively. The career choices aligned to this endorsement of teaching, nursing and health sciences, and law and public safety are in high demand and offer promising career paths for students in all urbanicities. While liberal arts and humanities jobs are not in the highest demand, the skills of communication, critical thinking, and creativity that are developed in this type of coursework are desired characteristics across pathways. A possible reason for the enrollment in these endorsements being low are that students interested in these ideas are enrolling in the Multidisciplinary endorsement or a combination of endorsements, allowing them to take some classes from multiple endorsements but not committing to a single career pathway.

The MEM that estimates the proportion of enrollment in FHSP, based on the predictive variables of type of district and composition of district population, shows that status as rural district was a significant influencer. It also demonstrated the percent of the district population that is African American/Black and Hispanic/Latino each had significant influence on the proportion of students in a district enrolled in FHSP in the first years of implementation. The differences between districts based on type of district as well as the proportion of the district

population that is African American/Black and Hispanic/Latino were anticipated in the hypotheses of the study and mirror results from previous studies. Finally, the model predicted that year was a significant influencer on the proportion of enrollees on FHSP, but that is expected based on the gradual rollout of the policy, with incoming students each year required to enroll under FHSP.

While rural districts are offering fewer endorsements, the model shows that compared to an average urban district a student in a rural district has higher odds of being enrolled in FHSP by 20 percent; each year that rolls by, the odds increase for that student even more. A possible reason for the higher enrollment that increases each year is that rural districts wanted to offer more flexibility to students that the FHSP plan offers. The new plans offer more space for taking electives such as CTE classes. It does this by reducing the requirements for advanced math and science coursework that was compulsory under the 4x4 Recommended plan and is still required for students to apply to a university in Texas. The research shows that students in rural districts are less likely to take college preparatory course though, so this finding is not unanticipated and was hypothesized.

The finding that there are significant differences in the proportion of enrollment in FHSP plans over 4x4 plans based on the proportion of the district population that is African American/Black and Hispanic/Latino, but that they have opposite impacts is very interesting. The model indicates that as the percent of the district population that is African American/Black increases, the predicted odds of a student in that district enrolling in FHSP is lower by .009, or decreased to .991 times the odds a student has in a district with average African American/Black enrollment. The model also indicates that as the percent of the district population that is Hispanic/Latino increases, the odds of a student in that district enrolling in FHSP is increased by

.003, or 1.003 times the odds a student has in a district with average Hispanic/Latino enrollment. A possible reason for this is that schools with higher proportions of Hispanic/Latino students moved students to the FHSP plan to provide them with the additional flexibility in their course-taking, allowing them to opt out of taking the higher level mathematics and science courses. This may have been done to take courses students identify as more closely aligning to their aspirations, or it may have been done to allow them to take courses that are less demanding and still graduate.

The data about graduates on the FHSP plan for 2015 and 2016 graduates showed that while the mean proportion of students graduating of FHSP out of all of the graduates increased from 9.8 percent to 18.2 percent, the median proportion of graduates on the FHSP plans for both years was 0. That means that at least half of the districts in the state had no graduates on the FHSP plan in 2015 and 2016. The maximum values for the proportion of graduates under the FHSP plan for both years was 1 in both suburban and rural urbanicity levels, indicating there were schools in those categories that moved all graduates to the FHSP plan. The maximum proportion of graduates in urban districts was .74 in 2015 and .90 in 2016. This indicates that while a few districts decided to move their entire system to the new graduation plans, a majority of districts chose to keep the seniors in 2014–2015 and 2015–2016 who started on the 4x4 plan on that plan through graduation. A possible reason for this is that districts leaving students on the older plan had less administrative work to do. FHSP requires all students have counseling on their endorsement choices, which is a high demand on the system. Districts leaving students on the 4x4 plan would have fewer students to counsel on the new plans and therefore less administration time spent on making unnecessary changes. It was not required that districts have graduates as early as 2016 under the FHSP plan, the first required graduates would be the

freshmen required to enroll in FHSP in 2014 who will graduate in 2018. However, it was an option that all districts and students had beginning in 2014.

The generalized linear model about the proportion of graduates in 2016 on the FHSP plan only noted a district type of rural as an influencer on the proportion of graduates on FHSP. The odds of a student in an average rural district graduating on the FHSP plan are more than 200 percent greater than a student in an average urban district. A possible reason for that is that rural districts wanted to introduce more flexibility in the student graduation plans, allowing them to graduate with more elective credits and fewer advanced math and science credits. The model did not show differences in graduation by the district population composition.

Overall, the hypotheses that the enrollment and graduation under the FHSP plans would be higher for students in rural districts was verified. The hypothesis that there would be significant differences in enrollment in the FHSP plans based the percent of a district's population that is African American/Black and Hispanic/Latino was also verified. There was not a significant difference in the proportion of graduates under the FHSP plans in 2016 as was hypothesized, nor did the models indicate any influence from the proportion of students in the district who were economically disadvantaged as was hypothesized.

Discussion: Analysis of Enrollment and Graduation in Distinguished Level of Achievement Data

As was mentioned previously, more than 80 percent of students graduating on the 4x4 plan before the FHSP plans were implemented consistently earned the course credits that are needed to be eligible for university admission in state schools in Texas and to qualify for university admission through the Top 10% Rule. The mean proportion of students enrolled and graduating with the distinguished level of achievement with the same course credits under FHSP

in the latest years for which there are data is 63 percent. There was not an increase of the proportion of students who chose to stay on the 4x4 plan that achieved the higher levels, so the overall proportion of students gaining these needed credits have already dropped. This constitutes a drop in the number of students graduating with the option of applying to a university about a fifth. This finding upholds the patterns discussed in the literature review of this study that show when students are provided with more options on lower tracks, the system is effectively providing incentives for students to choose those tracks and there are increased numbers of students taking lower tracks (Lee & Bryk, 1988). The FHSP plan provided four of five career endorsements that made it easier for students to graduate without more advanced math and science courses that were required for graduation on the 4x4 plan. These varied choices with lower requirements offered to students in high school are limiting their choices for postsecondary endeavors. Future studies about how much students and parents understand about their choices about high school studies impacting their options for postsecondary study will be an important topic for future studies.

The generalized linear model fitted to the data of proportion of enrollment in the distinguished level of achievement under FHSP showed no significant patterns in relation to the predictor variables of type of district or composition of district population. This seems very interesting as every other model in the study showed some differences either by urbanicity or population composition. A possible reason for that is that students who originally enrolled in the 4x4 plan, and were on track to graduate may have chosen to stay enrolled on the 4x4 plan causing a specific selection bias. It could also be that districts and students are still figuring out the differences between the many new plans on FHSP, their requirements, and what plans are best to enroll in. Students and teachers may assume that layering an endorsement's requirements

on top of the Foundation plan would get them what they need for university admission on the career tracks associated with the endorsements, even though that is not true for any endorsement other than STEM. This is an area that I think would benefit from additional studies once the FHSP plans are in full implementation and is discussed later in this chapter.

The generalized linear model that estimates the odds of students graduating on the distinguished level of achievement of those who are on FHSP showed significant differences that are influenced by both urbanicity and minority status in an interesting way. The model shows that the odds a student in a rural district graduating with the distinguished level of achievement if he/she graduated on the FHSP plan in 2016 are more than 200 percent higher than the odds of a student in an average urban district. Therefore, students in a rural district were much more likely to graduate on the FHSP plan and then much more likely to graduate with the distinguished level of achievement on the FHSP plan. The finding of a higher likelihood of students in rural districts graduating on the distinguished level of achievement under the FHSP plans is contrary to the hypothesis that students in rural district would be less likely to achieve the distinguished designation and to the research that says rural students are less likely to participate in higher level academics. This may be because the FHSP plan has more flexibility in the specific courses required, and those students who were on track to graduate on the Recommended plan on the 4x4 could graduate with similar credits on the distinguished plan under the FHSP plan. That means for these first years of implementation, changing to the FHSP plan and graduating on the distinguished level of achievement from the 4x4 Recommended plan would have been an even transfer with no additional credits required; it would still have allowed more flexibility in some of the coursework that has been noted as important in rural districts.

The final finding to discuss about the proportion of students graduating with the distinguished level of achievement of those graduating on FHSP is the finding that in suburban districts for each increase in a district's percent of African American/Black students enrolled, the predicted odds of a student graduating with the distinguished level of achievement who is enrolled in the FHSP plan drops by .078. Suburban districts with high African American/Black enrollments graduated significantly fewer students on the distinguished level of achievement of those who were enrolled in the FHSP plan in 2016. One possible explanation for this difference is that suburban schools with high enrollment of African American/Black students may have only moved students who would not have graduated on the Recommended plan under the 4x4 to the FHSP plans for graduation, which would have allowed those students to graduate on time but they would not have earned the distinguished level of achievement under FHSP. The enrollment in FHSP plans in 2016 did not show significant differences in this same way, so it may be that these districts used the FHSP graduation option as the last chance for students in this situation to graduate on time.

The hypotheses around these findings were that the evidence would show significant differences in proportions of students enrolled and graduating on the plans that render them eligible for university admission based on district type and the composition of the district population. The study did not reveal any predictive patterns in the enrollment of students in the distinguished level of achievement under the FHSP plan to date, though with only partial enrollment in FHSP during the years of this study patterns in enrollment in the distinguished level may be disguised. The data from full implementation years should be considered carefully to continue to look for any emerging evidence of this sort. There were patterns in the graduation data that showed higher likelihoods of students in rural districts graduating on the distinguished

plan and lower likelihoods of students in suburban districts with higher African American/Black enrollment graduating on the distinguished plan. The finding that students in rural districts were more likely to graduate with the distinguished level of achievement is contrary to the hypothesis and previous studies, and the enrollment data from the distinguished level of achievement in the same year did not show the same patterns. This finding for the one year of graduation rates may have been an anomaly, and data from future years will help frame what happened in 2016. The finding that having a higher enrollment of African American/Black students made it less likely students would graduate on the distinguished plan in aligned to the hypothesis but only is identified only as an influencer in suburban districts. The study did not find the kinds of significant differences anticipated in the enrollment in the distinguished level of achievement hypothesis by urbanicity or composition of the district population. There were no patterns in the data that showed the proportion of students in a district who are economically disadvantaged was a significant influencer on enrollment or graduation under the distinguished level of achievement under FHSP.

Concluding Discussion

This study sought to contribute to the understanding of the impacts of the HB5 graduation plans and whether these plans truly improve student achievement and engagement through tailored courses of study or if this plan effectively tracks students in their educational pathways in inequitable ways. The hypotheses of the study predicted that there would be evidence of inequities in offerings of endorsements in districts across Texas and that students would be disproportionately distributed into lower tracks based on the type of district they attend and the population composition of the district they attend. Specifically, the hypotheses predicted that rural districts would offer fewer endorsements and that districts with higher proportions of

African American/Black, Hispanic/Latino, and economically disadvantaged students would have fewer students enrolled in and graduating on the higher tracks.

C. Mills Wright (1956) theorized that an elite class exists in America who exercise great enough power to create structures that reliably bolster their privilege in society, reifying their established advantage. Evidence shows that tracking within the American education system is an example of that type of structure, allowing those in power—primarily the White and wealthy—to gain extended or enhanced educational credentials not available to everyone. These credentials provide advantages in the job market, earning higher paying jobs and more power to create additional or reinforce structures that benefit them.

This study found evidence that there are already great differences between rural districts and their nonrural counterparts in offerings of endorsements under HB 5 as well as in enrollment and graduation on HB 5 plans. Rural districts are composed of more economically disadvantaged students than other types of districts, and students from rural districts are typically more eager to contribute to their rural communities than to compete in a greater job market. The evidence shows that the HB 5 plans offer students in rural districts fewer choices of career endorsements and rural students were enrolled on the FHSP plans, which have lower graduation requirements, at higher rates than in other types of districts. The study also shows statistically significant differences in the rates of enrollment on the FHSP plans based on the proportion of a district's population that is African American/Black and Hispanic/Latino. These findings support the theory that the systems in place provide different experiences and outcomes for students enrolled in districts that do not primarily serve the more privileged populations. While the study did not find a direct connection between the predictors of type of district and composition of district population and the enrollment in the distinguished level of achievement under FHSP, there were

differences between the type of district and graduation under the distinguished level of achievement and a specific finding around the influence of the proportion of African American/Black students in suburban districts impacting the graduation on the distinguished level of achievement in 2016. This is all in addition to the finding that there is a large overall drop in the number of students who are graduating on plans that render them eligible for university admission. While future studies will further explicate the disparities in student opportunity and successes based on the type of districts they attend and the composition of the population that a district serves under the hierarchical set of graduation plans under HB 5, this initial study shows that the structures are providing disproportionate opportunity and success in its current state of implementation, providing greater advantage to those traditionally in power.

Limitations and Future Research

Although this study contributes to the understanding of the impact of implementing hierarchical sets of graduation plans, it has limitations to consider. First, and probably most important, is the masked values in the data provided by TEA that may have impacted the counts and proportions of students in categories that have the fewest students. These masks are likely to have a bigger impact on the analysis of the data for these initial years with the smaller numbers of students enrolled and graduating under the FHSP plans. The use of the average of the possible values for the masked values, 2.5, may have inflated some values, particularly in the categories for rural districts and minority student subgroups because those categories are more likely to have low numbers. This possibility should be considered in all study results.

Second, the study considers data from the very nascent stages of implementation of a statewide policy that impacts all students and their course of study in high school. While it is important to look at the data from the beginning stages of implementation, it cannot tell how the

implementation of this policy will impact students once fully engaged. As the study was conducted based on available data from TEA, all of a quantitative nature and with the district as the unit of analysis, patterns in data can be identified by district but why those patterns exist cannot be determined. Finally, the measure TEA uses for economically disadvantaged students is not the most effective measure due to its dichotomous nature and inaccurate identification of eligible students, especially at the high school level. The traditional undercounts of economically disadvantaged students in high school may have impacted the results of this study that found no significant influence from the proportion of students who are economically disadvantaged in offerings, enrollment, and graduation on FHSP or enrollment and graduation with the distinguished level of achievement on FHSP. This measure is the only one available through the TEA data, so it was the best option for the current study.

Future research recommendations include studies similar to this one around endorsement offerings, the proportion of students enrolled and graduating on each endorsement under FHSP, and the proportion of students enrolled and graduating with the distinguished level of achievement in the years of full implementation of the HB 5 policy across all high school grades with no other graduation plans available to students. I hope to examine these outcome variables in the next years of data using the same predictor variables of urbanicity as well as the proportion of each district that is composed of students of color and economically disadvantaged students. With full implementation, the data over the next few years might provide different insights into the influences of the predictor variables considered that would more closely match the previous research findings.

My years of experience working in school districts helps me to know that studies to examine the same outcomes and predictors but using the school as the unit of analysis rather than

the district are also needed. TEA reported in 2015 that only 5 percent of the districts that responded to their survey about endorsement offerings reported different endorsement offerings at schools across their districts. However, the survey did not associate the term *offering* with having to have a student enrolled in the endorsement as this study did. I anticipate that the two different definitions of what it means to be offering an endorsement will result in different outcomes of the study of endorsement offerings, especially if considered at the more specific school level. A district might say they are offering an endorsement at all schools in the district, but may only have students enrolled in that endorsement at some schools; there may be patterns in the enrollment based on the composition of the population of those schools. This level of analysis would provide a deeper investigation into whether there are inequalities in our school systems by identifying differences within and between schools in the students who are enrolled in each endorsement at each school and not just at the district level that will be helpful to understanding offerings and outcomes of these graduation plans.

Finally, qualitative studies that seek to understand the intent and implementation of the HB 5 policy will contribute to understanding of what is happening and what might better serve students. District and school leaders have to make decisions about what endorsements to offer. District and school leaders, counselors, teachers, parents, and students all have to make choices about enrollment in an endorsement, whether to drop the endorsement after their sophomore year, and whether to earn the distinguished level of achievement. Qualitative studies would help to understand the decision-making processes these stakeholders use, what information is available and what information they wish they had to help make those decisions, what advice they were given and by whom, and what their final decision points were. These studies would help shed light on whether students have the information, ability, and support for making real

choices about their course of study or if the school and system influence overshadows these decisions. This would in turn allow policies to be written that consider how to best inform and support these stakeholders in making their choices and what specific changes are needed in the culture, structures, and policy that would truly allow all students to select a course of study that meets their ambitions. Qualitative studies that investigate the intent of those policymakers who lobbied for or against HB5 and compared to the results produced by the policy implementation would also provide guidance as to how to frame and structure future policies around graduation plans that best serve students and society in the future.

Implications for Policy

The study results carry several implications for policy work in Texas and beyond. The HB 5 graduation plans introduced a new, multilevel set of graduation plans that have allowed students to choose an endorsement that more tightly tailors their course of study in high school to their career aspirations. These endorsements offer a wider range of pathways for students, but many of the pathways do not require students to earn the credits necessary to apply to a state university or gain admission to a state university through the Top 10% Rule. This study shows that the policy is being implemented inconsistently across the state by urbanicity, endorsements were offered at different rates, and students were enrolled and graduated in inequitable ways based on the type of district and the composition of the district's population.

The first and foremost implication of this study is that fewer students are graduating with the option of applying to a university in their postsecondary endeavors. HB 5 introduced more levels or tracks that students could choose that are lower tracks as they require fewer advanced math and science courses and directly limit their postsecondary options. By providing multiple pathways and more varied choices to students in their high school course of study that do not

meet the expectations of the higher education institutions of the state, this policy has limited students' postsecondary choices in a serious way. Only three quarters of the number of students who have graduated on the previous graduation plans with the course requirements needed to keep a university admission on their list of options for after high school graduation kept that opportunity after the FHSP plan was implemented. Whether students choose to attend a university after high school is up to them, but this policy has resulted in fewer students with that option.

Representative Mark Strama introduced an amendment to HB 5 that would have defaulted students into the higher tracks and allowed them to choose a lower track if desired, with the expressed intent of showing all students that the state has high expectations but allowing them to opt out if they felt it necessary. That amendment did not pass, so HB 5 went into place with students defaulted into the lower tracks. The result of this has been a steep decline in the number of students achieving the same outcomes as were achieved on the 4x4 plan. I feel that future policy should presume students can and will succeed on higher tracks, allowing them to opt out if necessary rather than presuming students will only succeed in lower tracks and allowing them to enter higher tracks if they so choose. The FHSP plans provide more choice for students while in high school, but many of those choices will not prepare them for college entry. The proponents of the bill say the choice allowed to them under FHSP is what will keep students engaged and allow them to tailor their study in high school. The decisions students make about their graduation plans in high school might severely limit their choices in post-secondary, which will limit their career choices and therefore their ability to achieve upward social and economic mobility. I believe ethically that the right choice for school systems to make for the students they serve is to default all students into higher tracks, provide the right supports for those who need it

so they can achieve those expectations, and only allow students to drop to lower tracks in circumstances that demand it. If choice in the course of study is desired and keeps students engaged, then the system should provide multiple choices that allow students access to all postsecondary options, including university admission. This analysis of the current policy supports the theory that the supposition of students being incapable or uninterested and defaulting them into lower tracks, results in greater numbers of students with limited postsecondary options.

The second implication that I find from this study is that policy implementation should be monitored more closely to ensure the intended results. The study shows that there are districts not following the policy or implementing in ways that are inequitable. The lawmakers who passed this bill expressed that they felt this policy was best for students of Texas in that it would offer them more freedom to tailor their education to their aspirations and that would produce positive outcomes for students. There are no specific statements from lawmakers about what they were aiming for as outcomes from this policy nor a definition of what we are preparing students for in their high school education. There was no public discussion of the career endorsements in this policy and how they align with the postsecondary requirements for the students in those career pathways. And to date, the only evaluation TEA has done on the policy was conducted by AIR in 2015 that only produced descriptive statistics about the implementation. There has been no analysis of the implementation at the level of this study that has been publicly released. I recommend that policymakers be required to clearly state their goals for a policy or at least what they hope will result from the policy for those who will be impacted. I also recommend that there should be mandatory evaluation of a policy implementation. If the policy is implemented in ways

that do not achieve the goals set out or are achieving them in inequitable ways, adjustments to the implementation or the policy itself should be made.

Lastly, this policy has had differing impacts through both offerings and outcomes in districts by urbanicity. Considering the context of rural schools and their unique challenges in serving students due to their size and isolation, the state should consider providing supports that would allow these rural districts to actualize the benefits to students intended by this policy. Rural districts are offering fewer endorsements to students. The CTE Center model is a proven method that expands the ability of student in rural districts to access the coursework they need through shared resources. I recommend that the state investigate the use of this model to allow rural districts to expand access and enrollment in the endorsements of STEM, Public Services, and Arts and Humanities as well as increasing the enrollment in the distinguished level of achievement. Allowing more students real choice in rural schools and exposing them to a broader curriculum will more accurately provide them with the opportunities that this bill was intended to create.

Appendix A

Files and Variables

File Name: districttype15
Publicly Available from TEA. Downloaded on 12/09/17
https://tea.texas.gov/acctres/analyze/1415/district1415.html

Variable Name	Description	Notes/Calculations
distname	District Name	
district	District Number	Used to match district data across files
urbanicity	District Type: Urban (Major Urban, Other Central City) Suburban (Major Suburban, Other Central City Suburban) Rural (Independent Town, Nonmetropolitan, Rural)	Used only 2014–2015. Very few changes between years, using one year provides consistency in analysis across years by urbanicity. (Also, 2016–2017 types not available yet)

File Name: enroll_combo15
TEA provided through secure access on 11/21/2017
A1710056_6_FHSP_ENDORSE_COMBOS_2015.csv

Variable Name	Description	Notes/Calculations
region	Region Number	
enroll_STEM_Black_15	Black number of students enrolled in STEM in 2014–2015	
enroll_Business_Black_15	Black number of students enrolled in Business in 2014–2015	
enroll_Public_Black_15	Black number of students enrolled in Public Service in 2014–2015	
enroll_Arts_Black_15	Black number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_Black_15	Black number of students enrolled in Multidisciplinary in 2014–2015	
enroll_ComboSTEM_Black_15	Black number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all Black students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Black_15	Black number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all black students enrolled in 2+ endorsements with none of them STEM
enroll_None_Black_15	Black number of students enrolled in No Endorsement in 2014–2015	
enroll_STEM_Hispanic_15	Hispanic number of students enrolled in STEM in 2014–2015	
enroll_Business_Hispanic_15	Hispanic number of students enrolled in Business in 2014–2015	

Variable Name	Description	Notes/Calculations
enroll_Public_Hispanic_15	Hispanic number of students enrolled in Public Service in 2014–2015	
enroll_Arts_Hispanic_15	Hispanic number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_Hispanic_15	Hispanic number of students enrolled in Multidisciplinary in 2014–2015	
enroll_ComboSTEM_Hispanic_15	Hispanic number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all Hispanic students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Hispanic_15	Hispanic number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all Hispanic students enrolled in 2+ endorsements with none of them STEM
enroll_None_Hispanic_15	Hispanic number of students enrolled in No Endorsement in 2014–2015	
enroll_STEM_White_15	White number of students enrolled in STEM in 2014–2015	
enroll_Business_White_15	White number of students enrolled in Business in 2014–2015	
enroll_Public_White_15	White number of students enrolled in Public Service in 2014–2015	
enroll_Arts_White_15	White number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_White_15	White number of students enrolled in Multidisciplinary in 2014–2015	
enroll_ComboSTEM_White_15	White number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all White students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_White_15	White number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all White students enrolled in 2+ endorsements with none of them STEM
enroll_None_White_15	White number of students enrolled in No Endorsement in 2014–2015	
enroll_STEM_LEP_15	LEP number of students enrolled in STEM in 2014–2015	
enroll_Business_LEP_15	LEP number of students enrolled in Business in 2014–2015	
enroll_Public_LEP_15	LEP number of students enrolled in Public Service in 2014–2015	
enroll_Arts_LEP_15	LEP number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_LEP_15	LEP number of students enrolled in Multidisciplinary in 2014–2015	

Variable Name	Description	Notes/Calculations
enroll_ComboSTEM_LEP_15	LEP number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all LEP students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_LEP_15	LEP number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all LEP students enrolled in 2+ endorsements with none of them STEM
enroll_None_LEP_15	LEP number of students enrolled in No Endorsement in 2014–2015	
enroll_STEM_Eco_15	ECODIS number of students enrolled in STEM in 2014–2015	
enroll_Business_Eco_15	ECODIS number of students enrolled in Business in 2014–2015	
enroll_Public_Eco_15	ECODIS number of students enrolled in Public Service in 2014–2015	
enroll_Arts_Eco_15	ECODIS number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_Eco_15	ECODIS number of students enrolled in Multidisciplinary in 2014–2015	
enroll_ComboSTEM_Eco_15	ECODIS number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all economically disadvantaged students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Eco_15	ECODIS number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all economically disadvantaged students enrolled in 2+ endorsements with none of them STEM
enroll_None_Eco_15	ECODIS number of students enrolled in No Endorsement in 2014–2015	
enroll_STEM_Male_15	Male number of students enrolled in STEM in 2014–2015	
enroll_Business_Male_15	Male number of students enrolled in Business in 2014–2015	
enroll_Public_Male_15	Male number of students enrolled in Public Service in 2014–2015	
enroll_Arts_Male_15	Male number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_Male_15	Male number of students enrolled in Multidisciplinary in 2014–2015	
enroll_ComboSTEM_Male_15	Male number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all male students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Male_15	Male number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all male students enrolled in 2+ endorsements with none of them STEM
enroll_None_Male_15	Male number of students enrolled in No Endorsement in 2014–2015	

Variable Name	Description	Notes/Calculations
enroll_STEM_Female_15	Female number of students enrolled in STEM in 2014–2015	
enroll_Business_Female_15	Female number of students enrolled in Business in 2014–2015	
enroll_Public_Female_15	Female number of students enrolled in Public Service in 2014–2015	
enroll_Arts_Female_15	Female number of students enrolled in Arts in 2014–2015	
enroll_Multidisc_Female_15	Female number of students enrolled in Multidisciplinary in 2014–2015	
enroll_ComboSTEM_Female_15	Female number of students enrolled in Combo w/ STEM in 2014–2015	Sum of all female students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Female_15	Female number of students enrolled in Combo w/o STEM in 2014–2015	Sum of all female students enrolled in 2+ endorsements with none of them STEM
enroll_None_Female_15	Female number of students enrolled in No Endorsement in 2014–2015	
enroll_FHSP_Black_15	Black/FHSP number of high school enrollees 2014-2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Hispanic_15	Hispanic/FHSP number of high school enrollees 2014–2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_White_15	White/FHSP number of high school enrollees 2014–2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_LEP_15	LEP/FHSP number of high school enrollees 2014–2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Eco_15	ECODIS/FHSP number of high school enrollees 2014–2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Male_15	Male/FHSP number of high school enrollees 2014–2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Female_15	Female/FHSP number of high school enrollees 2014–2015	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_STEMSTEMCOMBO_15	Total number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEMSTEM Combo enrollments from Male and Femal
enroll_STEMSTEMCombo_Black_15	Black number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Hisp_15	Hispanic number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory

Variable Name	Description	Notes/Calculations
enroll_STEMSTEMCombo_White_15	White number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_LEP_15	LEP number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Eco_15	ECODIS number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Male_15	Male number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Female_15	Female number of students enrolled in STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo enrollments to get total for subcategory
offer_stem_15	Binomial variable: Offering STEM 2014–2015	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_business_15	Binomial variable: Offering Business 2014-2015	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_public_15	Binomial variable: Offering Public Service 2014–2015	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_arts_15	Binomial variable: Offering Arts 2014–2015	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_multidisc_15	Binomial variable: Offering Multidisciplinary 2014–2015	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_total_15	Count variable: Number of endorsements offered 2014–2015	Count the number of *yes* (1) outcomes for offering variables for total number of endorsement offerings

File Name: enroll_combo16
TEA provided through secure access on 11/21/2017
A1710056_6_FHSP_ENDORSE_COMBOS_2016.csv

Variable Name	Description	Notes/Calculations
region	Region number	
enroll_STEM_Black_16	Black number of students enrolled in STEM in 2015–2016	
enroll_Business_Black_16	Black number of students enrolled in Business in 2015–2016	
enroll_Public_Black_16	Black number of students enrolled in Public Service in 2015–2016	
enroll_Arts_Black_16	Black number of students enrolled in Arts in 2015–2016	

Variable Name	Description	Notes/Calculations
enroll_Multidisc_Black_16	Black number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_Black_16	Black number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all Black students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Black_16	Black number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all Black students enrolled in 2+ endorsements with none of them STEM
enroll_None_Black_16	Black number of students enrolled in No Endorsement in 2015–2016	
enroll_STEM_Hispanic_16	Hispanic number of students enrolled in STEM in 2015–2016	
enroll_Business_Hispanic_16	Hispanic number of students enrolled in Business in 2015–2016	
enroll_Public_Hispanic_16	Hispanic number of students enrolled in Public Service in 2015–2016	
enroll_Arts_Hispanic_16	Hispanic number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_Hispanic_16	Hispanic number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_Hispanic_16	Hispanic number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all Hispanic students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Hispanic_16	Hispanic number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all Hispanic students enrolled in 2+ endorsements with none of them STEM
enroll_None_Hispanic_16	Hispanic number of students enrolled in No Endorsement in 2015–2016	
enroll_STEM_White_16	White number of students enrolled in STEM in 2015–2016	
enroll_Business_White_16	White number of students enrolled in Business in 2015–2016	
enroll_Public_White_16	White number of students enrolled in Public Service in 2015–2016	
enroll_Arts_White_16	White number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_White_16	White number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_White_16	White number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all White students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_White_16	White number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all White students enrolled in 2+ endorsements with none of them STEM

Variable Name	Description	Notes/Calculations
enroll_None_White_16	White number of students enrolled in No Endorsement in 2015–2016	
enroll_STEM_LEP_16	LEP number of students enrolled in STEM in 2015–2016	
enroll_Business_LEP_16	LEP number of students enrolled in Business in 2015–2016	
enroll_Public_LEP_16	LEP number of students enrolled in Public Service in 2015–2016	
enroll_Arts_LEP_16	LEP number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_LEP_16	LEP number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_LEP_16	LEP number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all LEP students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_LEP_16	LEP number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all LEP students enrolled in 2+ endorsements with none of them STEM
enroll_None_LEP_16	LEP number of students enrolled in No Endorsement in 2015–2016	
enroll_STEM_Eco_16	ECODIS number of students enrolled in STEM in 2015–2016	
enroll_Business_Eco_16	ECODIS number of students enrolled in Business in 2015–2016	
enroll_Public_Eco_16	ECODIS number of students enrolled in Public Service in 2015–2016	
enroll_Arts_Eco_16	ECODIS number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_Eco_16	ECODIS number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_Eco_16	ECODIS number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all economically disadvantaged students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Eco_16	ECODIS number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all economically disadvantaged students enrolled in 2+ endorsements with none of them STEM
enroll_None_Eco_16	ECODIS number of students enrolled in No Endorsement in 2015–2016	
enroll_STEM_Male_16	Male number of students enrolled in STEM in 2015–2016	
enroll_Business_Male_16	Male number of students enrolled in Business in 2015–2016	
enroll_Public_Male_16	Male number of students enrolled in Public Service in 2015–2016	

Variable Name	Description	Notes/Calculations
enroll_Arts_Male_16	Male number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_Male_16	Male number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_Male_16	Male number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all male students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Male_16	Male number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all male students enrolled in 2+ endorsements with none of them STEM
enroll_None_Male_16	Male number of students enrolled in No Endorsement in 2015–2016	
enroll_STEM_Female_16	Female number of students enrolled in STEM in 2015–2016	
enroll_Business_Female_16	Female number of students enrolled in Business in 2015–2016	
enroll_Public_Female_16	Female number of students enrolled in Public Service in 2015–2016	
enroll_Arts_Female_16	Female number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_Female_16	Female number of students enrolled in Multidisciplinary in 2015–2016	
enroll_ComboSTEM_Female_16	Female number of students enrolled in Combo w/ STEM in 2015–2016	Sum of all female students enrolled in 2+ endorsements with one of them STEM
enroll_ComboNoSTEM_Female_16	Female number of students enrolled in Combo w/o STEM in 2015–2016	Sum of all female students enrolled in 2+ endorsements with none of them STEM
enroll_None_Female_16	Female number of students enrolled in No Endorsement in 2015–2016	
enroll_FHSP_Black_16	Black/FHSP number of high school enrollees 2015–2016	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Hispanic_16	Hispanic/FHSP number of high school enrollees 2015–2016	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_White_16	White/FHSP number of high school enrollees 20115–2016	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_LEP_16	LEP/FHSP number of high school enrollees 201415–2016	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Eco_16	ECODIS/FHSP number of high school enrollees 2015–2016	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Male_16	Male/FHSP number of high school enrollees 2015–2016	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Female_16	Female/FHSP number of high school enrollees 2015–2016	Add all endorsement enrollment categories to get total for subcategory

Variable Name	Description	Notes/Calculations
enroll_FHSP_STEMSTEMCOMBO_16	Total number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEMSTEM Combo enrollments from male and female
enroll_STEMSTEMCombo_Black_16	Black number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Hisp_16	Hispanic number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_White_16	White number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_LEP_16	LEP number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Eco_16	ECODIS number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Male_16	Male number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Female_16	Female number of students enrolled in STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo enrollments to get total for subcategory
offer_stem_16	Binomial variable: Offering STEM 2015–2016	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_business_16	Binomial variable: Offering Business 2015–2016	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_public_16	Binomial variable: Offering Public Service 2015–2016	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_arts_16	Binomial variable: Offering Arts 2015–2016	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_multidisc_16	Binomial variable: Offering Multidisciplinary 2015–2016	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_total_16	Count variable: Number of endorsements offered 2015–2016	Count the number of *yes* (1) outcomes for offering variables for total number of endorsement offerings

File Name: enroll_combo17
TEA provided through secure access on 11/21/2017
A1710056_6_FHSP_ENDORSE_COMBOS_2017.csv

Variable Name	Description	Notes/Calculations
region	Region number	
enroll_STEM_Black_17	Black number of students enrolled in STEM in 2016–2017	
enroll_Business_Black_17	Black number of students enrolled in Business in 2016–2017	
enroll_Public_Black_17	Black number of students enrolled in Public Service in 2016–2017	
enroll_Arts_Black_17	Black number of students enrolled in Arts in 2016–2017	
enroll_Multidisc_Black_17	Black number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_Black_17	Black number of students enrolled in Combo w/ STEM in 2016–2017	Sum of all Black students enrolled in 2+ endorsements with one of them being STEM
enroll_ComboNoSTEM_Black_17	Black number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all Black students enrolled in 2+ endorsements with none of them being STEM
enroll_None_Black_17	Black number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_Hispanic_17	Hispanic number of students enrolled in STEM in 2016–2017	
enroll_Business_Hispanic_17	Hispanic number of students enrolled in Business in 2016–2017	
enroll_Public_Hispanic_17	Hispanic number of students enrolled in Public Service in 2016–2017	
enroll_Arts_Hispanic_17	Hispanic number of students enrolled in Arts in 2016–2017	
enroll_Multidisc_Hispanic_17	Hispanic number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_Hispanic_17	Hispanic number of students enrolled in Combo w/ STEM in 2016–2017	Sum of all Hispanic students enrolled in 2+ endorsements with one of them being STEM
enroll_ComboNoSTEM_Hispanic_17	Hispanic number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all Hispanic students enrolled in 2+ endorsements with none of them being STEM
enroll_None_Hispanic_17	Hispanic number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_White_17	White number of students enrolled in STEM in 2016–2017	

Variable Name	Description	Notes/Calculations
enroll_Business_White_17	White number of students enrolled in Business in 2016–2017	
enroll_Public_White_17	White number of students enrolled in Public Service in 2016–2017	
enroll_Arts_White_17	White number of students enrolled in Arts in 2016–2017	
enroll_Multidisc_White_17	White number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_White_17	White number of students enrolled in Combo w/ STEM in 2016–2017	Sum of all White students enrolled in 2+ endorsements with one of them being STEM
enroll_ComboNoSTEM_White_17	White number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all White students enrolled in 2+ endorsements with none of them being STEM
enroll_None_White_17	White number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_LEP_17	LEP number of students enrolled in STEM in 2016–2017	
enroll_Business_LEP_17	LEP number of students enrolled in Business in 2016–2017	
enroll_Public_LEP_17	LEP number of students enrolled in Public Service in 2016–2017	
enroll_Arts_LEP_17	LEP number of students enrolled in Arts in 2016–2017	
enroll_Multidisc_LEP_17	LEP number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_LEP_17	LEP number of students enrolled in Combo w/ STEM in 2016–2017	Sum of all LEP students enrolled in 2+ endorsements with one of them being STEM
enroll_ComboNoSTEM_LEP_17	LEP number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all LEP students enrolled in 2+ endorsements with none of them being STEM
enroll_None_LEP_17	LEP number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_Eco_17	ECODIS number of students enrolled in STEM in 2016–2017	
enroll_Business_Eco_17	ECODIS number of students enrolled in Business in 2016–2017	
enroll_Public_Eco_17	ECODIS number of students enrolled in Public Service in 2016–2017	
enroll_Arts_Eco_17	ECODIS number of students enrolled in Arts in 2016–2017	

Variable Name	Description	Notes/Calculations
enroll_Multidisc_Eco_17	ECODIS number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_Eco_17	ECODIS number of students enrolled in Combo w/ STEM in 2016–2017	Sum of all economically disadvantaged students enrolled in 2+ endorsements with one of them being STEM
enroll_ComboNoSTEM_Eco_17	ECODIS number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all economically disadvantaged students enrolled in 2+ endorsements with none of them being STEM
enroll_None_Eco_17	ECODIS number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_Male_17	Male number of students enrolled in STEM in 2016–2017	
enroll_Business_Male_17	Male number of students enrolled in Business in 2016–2017	
enroll_Public_Male_17	Male number of students enrolled in Public Service in 2016–2017	
enroll_Arts_Male_17	Male number of students enrolled in Arts in 2016–2017	
enroll_Multidisc_Male_17	Male number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_Male_17	Male number of students enrolled in Combo w/ STEM in 2016-2017	Sum of all male students enrolled in 2+ endorsements with one of them being STEM
enroll_ComboNoSTEM_Male_17	Male number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all male students enrolled in 2+ endorsements with none of them being STEM
enroll_None_Male_17	Male number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_Female_17	Female number of students enrolled in STEM in 2016–2017	
enroll_Business_Female_17	Female number of students enrolled in Business in 2016–2017	
enroll_Public_Female_17	Female number of students enrolled in Public Service in 2016–2017	
enroll_Arts_Female_17	Female number of students enrolled in Arts in 2016–2017	
enroll_Multidisc_Female_17	Female number of students enrolled in Multidisciplinary in 2016–2017	
enroll_ComboSTEM_Female_17	Female number of students enrolled in Combo w/ STEM in 2016–2017	Sum of all female students enrolled in 2+ endorsements with one of them being STEM

Variable Name	Description	Notes/Calculations
enroll_ComboNoSTEM_Female_17	Female number of students enrolled in Combo w/o STEM in 2016–2017	Sum of all female students enrolled in 2+ endorsements with none of them being STEM
enroll_None_Female_17	Female number of students enrolled in No Endorsement in 2016–2017	
enroll_STEM_17	Total number of students enrolled in STEM in 2016–2017	Total male and female enrollment in endorsement
enroll_Business_17	Total number of students enrolled in Business in 2016–2017	Total male and female enrollment in endorsement
enroll_Public_17	Total number of students enrolled in Public Service in 2016–2017	Total male and female enrollment in endorsement
enroll _Arts_17	Total number of students enrolled in Arts in 2016–2017	Total male and female enrollment in endorsement
enroll_Multidisc_17	Total number of students enrolled in Multidisciplinary in 2016–2017	Total male and female enrollment in endorsement
enroll_ComboSTEM_17	Total number of students enrolled in Combo w/ STEM in 2016–2017	Total male and female enrolled in 2+ endorsements one of which is STEM
enroll_None_17	Total number of students enrolled in No Endorsement in 2016–2017	Total male and female enrolled in FHSP but not an endorsement
enroll_FHSP_total_17	FHSP number of high school enrollees 2016–2017	Total male and female enrollment for FHSP
enroll_FHSP_Black_17	Black/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Hispanic_17	Hispanic/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_White_17	White/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_LEP_17	LEP/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Eco_17	ECODIS/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_Male_17	Male/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory

Variable Name	Description	Notes/Calculations
enroll_FHSP_Female_17	Female/FHSP number of high school enrollees 2016–2017	Add all endorsement enrollment categories to get total for subcategory
enroll_FHSP_STEMSTEMCOMBO_17	Total number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments from male and female categories
enroll_STEMSTEMCombo_Black_17	Black number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Hisp_17	Hispanic number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_White_17	White number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_LEP_17	LEP number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Eco_17	ECODIS number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Male_17	Male number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
enroll_STEMSTEMCombo_Female_17	Female number of students enrolled in STEM or Combo w/ STEM in 2016–2017	Add STEM and STEM Combo enrollments to get total for subcategory
offer_stem_17	Binomial variable: Offering STEM 2016–2017	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_business_17	Binomial variable: Offering Business 2016–2017	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_public_17	Binomial variable: Offering Public Service 2016–2017	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_arts_17	Binomial variable: Offering Arts 2016–2017	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_multidisc_17	Binomial variable: Offering Multidisciplinary 2016–2017	Offering variable *yes* (1) if at least one student is enrolled in this endorsement
offer_total_17	Count variable: Number of endorsements offered 2016–2017	Count the number of *yes* (1) outcomes for offering variables

File Name: enroll_public_combo15
Publicly available from TEA. Downloaded 12/02/2017
Count of FHSP Enrollment by Endorsement Combination 2014-15
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Enrollment_Reports/fhsp_enroll_statewide_district_report.html

Variable Name	Description	Notes/Calculations
enroll_STEM_15	Total number of students enrolled in STEM in 2014–2015	
enroll_Business_15	Total number of students enrolled in Business in 2014–2015	
enroll_Public_15	Total number of students enrolled in Public Service in 2014–2015	
enroll_Arts_15	Total number of students enrolled in Arts in 2014v2015	
enroll_Multidisc_15	Total number of students enrolled in Multidisciplinary in 2014–2015	
enroll_Combo STEM_15	Total number of students enrolled in Combo w/ STEM in 2014–2015	
enroll_Combo NoSTEM_15	Total number of students enrolled in Combo w/o STEM in 2014–2015	
enroll_None_15	Total number of students enrolled in No Endorsement in 2014–2015	
enroll_FHSP_ total_15	FHSP number of high school enrollees 2014–2015	Sum all endorsement categories

File Name: enroll_public_combo16
Publicly available from TEA. Downloaded 12/02/2017
Count of FHSP Enrollment by Endorsement Combination 2015-16
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Enrollment_Reports/fhsp_enroll_statewide_district_report.html

Variable Name	Description	Notes/Calculations
enroll_STEM_16	Total number of students enrolled in STEM in 2015–2016	
enroll_Business_16	Total number of students enrolled in Business in 2015–2016	
enroll_Public_16	Total number of students enrolled in Public Service in 2015–2016	
enroll_Arts_16	Total number of students enrolled in Arts in 2015–2016	
enroll_Multidisc_16	Total number of students enrolled in Multidisciplinary in 2015–2016	

Variable Name	Description	Notes/Calculations
enroll_Combo STEM_16	Total number of students enrolled in Combo w/ STEM in 2015–2016	
enroll_Combo NoSTEM_16	Total number of students enrolled in Combo w/o STEM in 2015–2016	
enroll_None_16	Total number of students enrolled in No Endorsement in 2015–2016	
enroll_FHSP_ total_16	FHSP number of high school enrollees 2015–2016	Sum all endorsement categories

File Name: enroll_distinguished15
TEA provided through secure access on 11/21/2017
A1710056_5_FHSP_DIST_ACHIEVE_2015.csv

Variable Name	Description	Notes/Calculations
enroll_dist_lep_1 5	LEP number of students enrolled in Distinguished designation in 2014–2015	
enroll_dist_eco_1 5	ECODIS number of students enrolled in Distinguished designation in 2014–2015	
enroll_dist_male _15	Male number of students enrolled in Distinguished designation in 2014–2015	
enroll_dist_femal e_15	Female number of students enrolled in Distinguished designation in 2014–2015	
enroll_dist_total mf_15	Total number of students enrolled in Distinguished designation in 2014–2015	Add total for male and female

File Name: enroll_distinguished16
TEA provided through secure access on 11/21/2017
A1710056_5_FHSP_DIST_ACHIEVE_2016.csv

Variable Name	Description	Notes/Calculations
enroll_dist_lep_1 6	LEP number of students enrolled in Distinguished designation in 2015–2016	
enroll_dist_eco_1 6	ECODIS number of students enrolled in Distinguished designation in 2015–2016	
enroll_dist_male _16	Male number of students enrolled in Distinguished designation in 2015–2016	

Variable Name	Description	Notes/Calculations
enroll_dist_female_16	Female number of students enrolled in Distinguished designation in 2015–2016	
enroll_dist_totalmf_16	Total number of students enrolled in Distinguished designation in 2015–2016	Add total for male and female

File Name: enroll_distinguished17
TEA provided through secure access on 11/21/2017
A1710056_5_FHSP_DIST_ACHIEVE_2017.csv

Variable Name	Description	Notes/Calculations
enroll_dist_totalmf_17	Total number of students enrolled in Distinguished designation in 2016–2017	Add total for male and female
enroll_dist_lep_17	LEP number of students enrolled in Distinguished designation in 2016–2017	
enroll_dist_eco_17	ECODIS number of students enrolled in Distinguished designation in 2016–2017	
enroll_dist_male_17	Male number of students enrolled in Distinguished designation in 2016–2017	
enroll_dist_female_17	Female number of students enrolled in Distinguished designation in 2016–2017	

File Name: enroll_public_distinguished15
Publicly available from TEA. Downloaded 12/02/2017
Count of FHSP Enrollment by Distinguished Level of Achievement and Ethnicity 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Enrollment_Reports/fhsp_enroll_statewide_district_report.html

Variable Name	Description	Notes/Calculations
enroll_dist_Black_15	Black number of students enrolled in Distinguished designation in 2014–2015	
enroll_dist_Hispanic_15	Hispanic number of students enrolled in Distinguished designation in 2014–2015	
enroll_dist_White_15	White number of students enrolled in Distinguished designation in 2014–2015	

File Name: enroll_public_distinugished16
Publicly available from TEA. Downloaded 12/02/2017
Count of FHSP Enrollment by Distinguished Level of Achievement and Ethnicity 2015–2016
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Enrollment_Reports/fhsp_enroll_statewide_district_report.html

Variable Name	Description	Notes/Calculations
enroll_dist_ Black_16	Black number of students enrolled in Distinguished designation in 2015–2016	
enroll_dist_ Hispanic_16	Hispanic number of students enrolled in Distinguished designation in 2015–2016	
enroll_dist_ White_16	White number of students enrolled in Distinguished designation in 2015–2016	

File Name: enroll_public_distinguisted17
TEA provided through secure access on 12/19/2017 (will be public)
A1710056_8_fhsp_enroll_achievements_statewide_DISTRICT_2017

Variable Name	Description	Notes/Calculations
enroll_dist_ Black_17	Black number of students enrolled in Distinguished designation in 2016–2017	
enroll_dist_ Hispanic_17	Hispanic number of students enrolled in Distinguished designation in 2016–2017	
enroll_dist_ White_17	White number of students enrolled in Distinguished designation in 2016–2017	

File Name: enroll_public_grade15
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ district_15	Total number of high school enrollees 2014–2015	Sum of district 9th, 10th, 11th and 12th grade district enrollees
enroll_total_ district_15	Total number of students 2014–2015	Sum of K–12 district enrollees

File Name: enroll_public_graderace15
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade and Ethnicity, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ Black_15	Black number of high school enrollees 2014–2015	Added grades 9–12 enrollments
enroll_HStotal_ Hispanic_15	Hispanic number of high school enrollees 2014–2015	Added grades 9–12 enrollments
enroll_HStotal_ White_15	White number of high school enrollees 2014–2015	Added grades 9–12 enrollments

File Name: enroll_public_gradegender15
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade and Gender, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ male_15	Male number of high school enrollees 2014–2015	Add males grades 9, 10, 11, 12
enroll_HStotal_ female_15	Female number of high school enrollees 2014–2015	Add females grades 9, 10, 11, 12

File Name: enroll_public_grade16
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2015–2016
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ district_16	Total number of high school enrollees 2015–2016	Sum of district 9th, 10th, 11th, and 12th grade district enrollees
enroll_total_ district_16	Total number of students 2015–2016	Sum of K–12 district enrollees

File Name: enroll_public_graderace16
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade and Ethnicity, 2015–2016
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ Black_16	Black number of high school enrollees 2015–2016	Added grades 9–12 enrollments
enroll_HStotal_ Hispanic_16	Hispanic number of high school enrollees 2015–2016	Added grades 9–12 enrollments
enroll_HStotal_ White_16	White number of high school enrollees 2015–2016	Added grades 9–12 enrollments

File Name: enroll_public_gradegender16
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade and Gender, 2015–2016
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ male_16	Male number of high school enrollees 2015–2016	Add males grades 9, 10, 11, 12
enroll_HStotal_ female_16	Female number of high school enrollees 2015–2016	Add females grades 9, 10, 11, 12

File Name: enroll_public_grade17
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2016–2017
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ district_17	Total number of high school enrollees 2016–2017	Sum of district 9th, 10th, 11th, and 12th grade district enrollees
enroll_total_ district_17	Total number of students 2016–2017	Sum of K–12 district enrollees

File Name: enroll_public_graderace17
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade and Ethnicity, 2016–2017
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ Black_17	Black number of high school enrollees 2016–2017	Added grades 9–12 enrollments
enroll_HStotal_ Hispanic_17	Hispanic number of high school enrollees 2016–2017	Added grades 9–12 enrollments
enroll_HStotal_ White_17	White number of high school enrollees 2016–2017	Added grades 9–12 enrollments

File Name: enroll_public_gradegender17
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade and Gender, 2016–2017
https://rptsvr1.tea.texas.gov/adhocrpt/adste.html

Variable Name	Description	Notes/Calculations
enroll_HStotal_ male_17	Male number of high school enrollees 2016–2017	Add males grades 9, 10, 11, 12
enroll_HStotal_ female_17	Female number of high school enrollees 2016–2017	Add females grades 9, 10, 11, 12

File Name: enroll_public_lep15
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/adleplg.html

Variable Name	Description	Notes/Calculations
enroll_total_ lep_15	LEP number of high school enrollees 2014–2015	Sum of district 9th, 10th, 11th, and 12th grade students in the district identified as LEP

File Name: enroll_public_lep16
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2015–2016
https://rptsvr1.tea.texas.gov/adhocrpt/adleplg.html

Variable Name	Description	Notes/Calculations
enroll_total_ lep_16	LEP number of high school enrollees 2014–2015	Sum of district 9th, 10th, 11th, and 12th grade students in the district identified as LEP

File Name: enroll_public_lep17
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2016–2017
https://rptsvr1.tea.texas.gov/adhocrpt/adleplg.html

Variable Name	Description	Notes/Calculations
enroll_total_ lep_17	LEP number of high school enrollees 2014–2015	Sum of district 9th, 10th, 11th, and 12th grade students in the district identified as LEP

File Name: enroll_public_ecodis15
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/adstc.html

Variable Name	Description	Notes/Calculations
enroll_HSest_ ecodis_15	ECODIS number of high school enrollees 2014–2015	1 - count of noneconomically disadvantaged/total district enrollment (from **enroll_public_grade15) * Total HS enrollment**

File Name: enroll_public_ecodis16
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2015–2016
https://rptsvr1.tea.texas.gov/adhocrpt/adstc.html

Variable Name	Description	Notes/Calculations
enroll_HSest_ ecodis_16	ECODIS number of high school enrollees 2015–2016	1 - count of noneconomically disadvantaged/total district enrollment (from **enroll_public_grade16) * Total HS enrollment**

File Name: enroll_public_ecodis17
Publicly available from TEA. Downloaded 12/19/2017
Statewide District Totals by Grade, 2016-2017
https://rptsvr1.tea.texas.gov/adhocrpt/adstc.html

Variable Name	Description	Notes/Calculations
enroll_HSest_ ecodis_17	ECODIS number of high school enrollees 2016-2017	1 - count of noneconomically disadvantaged/total district enrollment (from **enroll_public_grade17) * Total HS enrollment**

grad_combo15
TEA provided through secure access on 11/21/2017
A1710056_3_FHSP_GRAD_COMBOS_2015.csv

Variable Name	Description	Notes/Calculations
grad_STEM_Black_15	Black number of students graduated with STEM in 2014–2015	
grad_Business_Black_15	Black number of students graduated with Business in 2014–2015	
grad_Public_Black_15	Black number of students graduated with Public Service in 2014–2015	
grad_Arts_Black_15	Black number of students graduated with Arts in 2014–2015	
grad_Multidisc_Black_15	Black number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_Black_15	Black number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Black_15	Black number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Black_15	Black number of students graduated with No Endorsement in 2014–2015	
grad_STEM_Hispanic_15	Hispanic number of students graduated with STEM in 2014–2015	
grad_Business_Hispanic_15	Hispanic number of students graduated with Business in 2014–2015	
grad_Public_Hispanic_15	Hispanic number of students graduated with Public Service in 2014–2015	
grad_Arts_Hispanic_15	Hispanic number of students graduated with Arts in 2014–2015	
grad_Multidisc_Hispanic_15	Hispanic number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_Hispanic_15	Hispanic number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Hispanic_15	Hispanic number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Hispanic_15	Hispanic number of students graduated with No Endorsement in 2014–2015	
grad_STEM_White_15	White number of students graduated with STEM in 2014–2015	

Variable Name	Description	Notes/Calculations
grad_Business_White_15	White number of students graduated with Business in 2014–2015	
grad_Public_White_15	White number of students graduated with Public Service in 2014–2015	
grad_Arts_White_15	White number of students graduated with Arts in 2014–2015	
grad_Multidisc_White_15	White number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_White_15	White number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_White_15	White number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_White_15	White number of students graduated with No Endorsement in 2014–2015	
grad_STEM_LEP_15	LEP number of students graduated with STEM in 2014–2015	
grad_Business_LEP_15	LEP number of students graduated with Business in 2014–2015	
grad_Public_LEP_15	LEP number of students graduated with Public Service in 2014–2015	
grad_Arts_LEP_15	LEP number of students graduated with Arts in 2014–2015	
grad_Multidisc_LEP_15	LEP number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_LEP_15	LEP number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_LEP_15	LEP number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_LEP_15	LEP number of students graduated with No Endorsement in 2014–2015	
grad_STEM_Eco_15	ECODIS number of students graduated with STEM in 2014–2015	
grad_Business_Eco_15	ECODIS number of students graduated with Business in 2014–2015	
grad_Public_Eco_15	ECODIS number of students graduated with Public Service in 2014–2015	
grad_Arts_Eco_15	ECODIS number of students graduated with Arts in 2014–2015	

Variable Name	Description	Notes/Calculations
grad_Multidisc_Eco_15	ECODIS number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_Eco_15	ECODIS number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Eco_15	ECODIS number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Eco_15	ECODIS number of students graduated with No Endorsement in 2014–2015	
grad_STEM_Male_15	Male number of students graduated with STEM in 2014–2015	
grad_Business_Male_15	Male number of students graduated with Business in 2014–2015	
grad_Public_Male_15	Male number of students graduated with Public Service in 2014–2015	
grad_Arts_Male_15	Male number of students graduated with Arts in 2014–2015	
grad_Multidisc_Male_15	Male number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_Male_15	Male number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Male_15	Male number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Male_15	Male number of students graduated with No Endorsement in 2014–2015	
grad_STEM_Female_15	Female number of students graduated with STEM in 2014–2015	
grad_Business_Female_15	Female number of students graduated with Business in 2014–2015	
grad_Public_Female_15	Female number of students graduated with Public Service in 2014–2015	
grad_Arts_Female_15	Female number of students graduated with Arts in 2014–2015	
grad_Multidisc_Female_15	Female number of students graduated with Multidisciplinary in 2014–2015	
Grad_ComboSTEM_Female_15	Female number of students graduated with Combo w/ STEM in 2014–2015	Add together total graduates in each combination of enrollment that includes STEM

Variable Name	Description	Notes/Calculations
Grad_ComboNoSTEM_Female_15	Female number of students graduated with Combo w/o STEM in 2014–2015	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Female_15	Female number of students graduated with No Endorsement in 2014–2015	
grad_STEMComboStem_total_15	Total number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads male and female
grad_STEMComboStem_Black_15	Black number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Hispanic_15	Hispanic number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_White_15	White number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_LEP_15	LEP number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Eco_15	ECODIS number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Male_15	Male number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Female_15	Female number of students graduated with STEM or Combo w/ STEM in 2014–2015	Add STEM and STEM Combo grads for the subcategory
grad_FHSP_Black_2015	Black/FHSP number of high school graduates 2014–2015	Add all Black graduates for endorsement categories
grad_FHSP_Hispanic_2015	Hispanic/FHSP number of high school graduates 2014–2015	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_White_2015	White/FHSP number of high school graduates 2014–2015	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_LEP_2015	LEP/FHSP number of high school graduates 2014–2015	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_Eco_2015	ECODIS/FHSP number of high school graduates 2014–2015	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_Male_2015	Male/FHSP number of high school graduates 2014–2015	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_Female_15	Female/FHSP number of high school graduates 2014–2015	Add all graduates for this subcategory in each endorsement categories

File Name: grad_combo16
TEA provided through secure access on 11/21/2017
A1710056_3_FHSP_GRAD_COMBOS_2016.csv

Variable Name	Description	Notes/Calculations
grad_STEM_Black_16	Black number of students graduated with STEM in 2015–2016	
grad_Business_Black_16	Black number of students graduated with Business in 2015–2016	
grad_Public_Black_16	Black number of students graduated with Public Service in 2015–2016	
grad_Arts_Black_16	Black number of students graduated with Arts in 2015–2016	
grad_Multidisc_Black_16	Black number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_Black_16	Black number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Black_16	Black number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Black_16	Black number of students graduated with No Endorsement in 2015–2016	
grad_STEM_Hispanic_16	Hispanic number of students graduated with STEM in 2015–2016	
grad_Business_Hispanic_16	Hispanic number of students graduated with Business in 2015–2016	
grad_Public_Hispanic_16	Hispanic number of students graduated with Public Service in 2015–2016	
grad_Arts_Hispanic_16	Hispanic number of students graduated with Arts in 2015–2016	
grad_Multidisc_Hispanic_16	Hispanic number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_Hispanic_16	Hispanic number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Hispanic_16	Hispanic number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Hispanic_16	Hispanic number of students graduated with No Endorsement in 2015–2016	
grad_STEM_White_16	White number of students graduated with STEM in 2015–2016	

Variable Name	Description	Notes/Calculations
grad_Business_White_16	White number of students graduated with Business in 2015–2016	
grad_Public_White_16	White number of students graduated with Public Service in 2015–2016	
grad_Arts_White_16	White number of students graduated with Arts in 2015–2016	
grad_Multidisc_White_16	White number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_White_16	White number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_White_16	White number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_White_16	White number of students graduated with No Endorsement in 2015–2016	
grad_STEM_LEP_16	LEP number of students graduated with STEM in 2015–2016	
grad_Business_LEP_16	LEP number of students graduated with Business in 2015–2016	
grad_Public_LEP_16	LEP number of students graduated with Public Service in 2015–2016	
grad_Arts_LEP_16	LEP number of students graduated with Arts in 2015–2016	
grad_Multidisc_LEP_16	LEP number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_LEP_16	LEP number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_LEP_16	LEP number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_LEP_16	LEP number of students graduated with No Endorsement in 2015–2016	
grad_STEM_Eco_16	ECODIS number of students graduated with STEM in 2015–2016	
grad_Business_Eco_16	ECODIS number of students graduated with Business in 2015–2016	
grad_Public_Eco_16	ECODIS number of students graduated with Public Service in 2015–2016	
grad_Arts_Eco_16	ECODIS number of students graduated with Arts in 2015–2016	

Variable Name	Description	Notes/Calculations
grad_Multidisc_Eco_16	ECODIS number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_Eco_16	ECODIS number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Eco_16	ECODIS number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Eco_16	ECODIS number of students graduated with No Endorsement in 2015–2016	
grad_STEM_Male_16	Male number of students graduated with STEM in 2015–2016	
grad_Business_Male_16	Male number of students graduated with Business in 2015–2016	
grad_Public_Male_16	Male number of students graduated with Public Service in 2015–2016	
grad_Arts_Male_16	Male number of students graduated with Arts in 2015–2016	
grad_Multidisc_Male_16	Male number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_Male_16	Male number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM
grad_ComboNoSTEM_Male_16	Male number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Male_16	Male number of students graduated with No Endorsement in 2015–2016	
grad_STEM_Female_16	Female number of students graduated with STEM in 2015–2016	
grad_Business_Female_16	Female number of students graduated with Business in 2015–2016	
grad_Public_Female_16	Female number of students graduated with Public Service in 2015–2016	
grad_Arts_Female_16	Female number of students graduated with Arts in 2015–2016	
grad_Multidisc_Female_16	Female number of students graduated with Multidisciplinary in 2015–2016	
Grad_ComboSTEM_Female_16	Female number of students graduated with Combo w/ STEM in 2015–2016	Add together total graduates in each combination of enrollment that includes STEM

Variable Name	Description	Notes/Calculations
Grad_ComboNoSTEM_Female_16	Female number of students graduated with Combo w/o STEM in 2015–2016	Add together total graduates in each combination of enrollment that does not include STEM
grad_None_Female_16	Female number of students graduated with No Endorsement in 2015–2016	
grad_STEMComboStem_total_16	Total number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads male and female
grad_STEMComboStem_Black_16	Black number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Hispanic_16	Hispanic number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_White_16	White number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_LEP_16	LEP number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Eco_16	ECODIS number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Male_16	Male number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_STEMComboStem_Female_16	Female number of students graduated with STEM or Combo w/ STEM in 2015–2016	Add STEM and STEM Combo grads for the subcategory
grad_FHSP_Black_2016	Black/FHPS number of high school graduates 2015-2016	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_Hispanic_2016	Hispanic/FHPS number of high school graduates 2015–2016	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_White_2016	White/FHPS number of high school graduates 2015–2016	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_LEP_2016	LEP/FHPS number of high school graduates 2015–2016	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_Eco_2016	ECODIS/FHPS number of high school graduates 2015–2016	Add all graduates for this subcategory in each endorsement categories
grad_FHSP_Male_2016	Male/FHPS number of high school graduates 2015–2016	Add all graduates for this subcategory in each endorsement categories

Variable Name	Description	Notes/Calculations
grad_FHSP_Female_16	Female/FHPS number of high school graduates 2015–2016	Add all graduates for this subcategory in each endorsement categories

File Name: grad_public_combo15
Publicly Available from TEA. Downloaded on 12/09/17
Count of FHSP Graduates by Endorsement Combination, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Graduate_Reports/fhsp_grad_statewide_district_report.html

Variable Name	Description	Notes/Calculations
grad_STEM_15	Total number of students graduated with STEM in 2014–2015	
grad_Bunsiness_15	Total number of students graduated with Business in 2014–2015	
grad_Public_15	Total number of students graduated with Public Service in 2014–2015	
grad_Arts_15	Total number of students graduated with Arts in 2014–2015	
grad_Multidisc_15	Total number of students graduated with Multidisciplinary in 2014–2015	
grad_ComboSTEM_15	Total number of students graduated with Combo w/ STEM in 2014–2015	
grad_ComboNoSTEM_15	Total number of students graduated with Combo w/o STEM in 2014–2015	
grad_None_15	Total number of students graduated with No Endorsement in 2014–2015	
grad_fhsp_total_15	FHSP total HS graduates 2014–2015	Add all grads from each endorsement category

File Name: grad_public_combo16
Publicly Available from TEA. Downloaded on 12/09/17
Count of FHSP Graduates by Endorsement Combination, 2015-16
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Graduate_Reports/fhsp_grad_statewide_district_report.html

Variable Name	Description	Notes/Calculations
grad_STEM_16	Total number of students graduated with STEM in 2015–2016	
grad_Bunsiness_16	Total number of students graduated with Business in 2015–2016	
grad_Public_16	Total number of students graduated with Public Service in 2015–2016	
grad_Arts_16	Total number of students graduated with Arts in 2015–2016	

Variable Name	Description	Notes/Calculations
grad_Multidisciplinary_16	Total number of students graduated with Multidisciplinary in 2015–2016	
grad_ComboSTEM_16	Total number of students graduated with Combo w/ STEM in 2015–2016	
grad_ComboNoSTEM_16	Total number of students graduated with Combo w/o STEM in 2015–2016	
grad_None_16	Total number of students graduated with No Endorsement in 2015–2016	
grad_fhsp_total_15	FHSP total HS graduates 2015–2016	Add all grads from each endorsement category

File Name: grad_distinguished15
TEA provided through secure access on 11/21/2017
A1710056_2_FHSP_GRAD_DIST_ACHIEVE_2015.csv

Variable Name	Description	Notes/Calculations
grad_dist_lep_15	LEP number of students graduated with Distinguished Level of Achievement in 2014–2015	
grad_dist_eco_15	ECODIS number of students graduated with Distinguished Level of Achievement in 2014–2015	
grad_dist_male_15	Male number of students graduated with Distinguished Level of Achievement in 2014–2015	
grad_dist_female_15	Female number of students graduated with Distinguished Level of Achievement in 2014–2015	

File Name: grad_distinguished16
TEA provided through secure access on 11/21/2017
A1710056_2_FHSP_GRAD_DIST_ACHIEVE_2016.csv

Variable Name	Description	Notes/Calculations
grad_dist_lep_16	LEP number of students graduated with Distinguished Level of Achievement in 2015–2016	
grad_dist_eco_16	ECODIS number of students graduated with Distinguished Level of Achievement in 2015–2016	
grad_dist_male_16	Male number of students graduated with Distinguished Level of Achievement in 2015–2016	

Variable Name	Description	Notes/Calculations
grad_dist_female_16	Female number of students graduated with Distinguished Level of Achievement in 2015–2016	

File Name: grad_public_distinguished15
Publicly Available from TEA. Downloaded on 12/09/17
Count of FHSP Graduates by Distinguished Level of Achievement and Ethnicity, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Graduate_Reports/fhsp_grad_statewide_district_report.html

Variable Name	Description	Notes/Calculations
grad_dist_Black_15	Black number of students graduated with Distinguished Level of Achievement in 2014–2015	
grad_dist_Hispanic_15	Hispanic number of students graduated with Distinguished Level of Achievement in 2014–2015	
grad_dist_White_15	White number of students graduated with Distinguished Level of Achievement in 2014–2015	

File Name: grad_public_distinugished16
Publicly Available from TEA. Downloaded on 12/09/17
Count of FHSP Graduates by Distinguished Level of Achievement and Ethnicity, 2014–2015
https://rptsvr1.tea.texas.gov/adhocrpt/Standard_Reports/FHSP_Graduate_Reports/fhsp_grad_statewide_district_report.html

Variable Name	Description	Notes/Calculations
grad_dist_Black_16	Black number of students graduated with Distinguished Level of Achievement in 2015–2016	
grad_dist_Hispanic_16	Hispanic number of students graduated with Distinguished Level of Achievement in 2015–2016	
grad_dist_White_16	White number of students graduated with Distinguished Level of Achievement in 2015–2016	

File Name: grad_tapr_regular_district15
Publicly Available from TEA. Downloaded on 12/19/17
Texas Academic Performance Report, 2015-2016, Data download, TAPR Data in Excel, District Download (Note: 2015-16 TAPR Report has data on 2014–2015 graduates)
https://rptsvr1.tea.texas.gov/cgi/sas/broker?_service=marykay&prgopt=2016/xplore/setdists.sas&year4=2016&_program=perfrept.perfmast.sas&sumlev=D&steps=2

Variable Name	Description	Notes/Calculations
grad_disting_15	Total number of students graduated with Distinguished Level of Achievement in 2014–2015	
grad_total_15	Total number of high school graduates 2014–2015	
grad_black_15	Number of Black high school graduates 2014–2015	
grad_hispanic_15	Number of Hispanic high school graduates 2014–2015	
grad_white_15	Number of White high school graduates 2014–2015	
grad_LEP_15	Number of LEP high school graduates 2014–2015	
grad_eco_15	Number of economically disadvantaged high school graduates 2014–2015	

File Name: grad_tapr_regular_district17
Publicly Available from TEA. Downloaded on 12/19/17
Texas Academic Performance Report, 2016-2017, Data download, TAPR Data in Excel, District Download
https://rptsvr1.tea.texas.gov/cgi/sas/broker?_service=marykay&prgopt=2016/xplore/setdists.sas&year4=2016&_program=perfrept.perfmast.sas&sumlev=D&steps=2

Variable Name	Description	Notes/Calculations
grad_disting_16	Total number of students graduated with Distinguished Level of Achievement in 2015–2016	
grad_total_16	Total number of high school graduates 2015–2016	
grad_black_16	Number of Black high school graduates 2015–2016	
grad_hispanic_16	Number of Hispanic high school graduates 2015–2016	
grad_white_16	Number of White high school graduates 2015–2016	
grad_LEP_16	Number of LEP high school graduates 2015–2016	
grad_eco_16	Number of economically disadvantaged high school graduates 2015–2016	

Appendix B

Proportion Variables

Enrollment Proportions

Total and student group FHSP/total

Proportion	Calculation	Variable Name
High school students enrolled in FHSP	enroll_FHSP_total/enroll_HStotal_district	p_enroll_fhsp_total
Black high school students enrolled in FHSP	enroll_FHSP_Black/enroll_HStotal_Black	p_ enroll_fhspB_totalB
Hispanic high school students enrolled in FHSP	enroll_FHSP_Hispanic/enroll_HStotal_Hispanic	p_ enroll_fhspH_totalH
White high school students enrolled in FHSP	enroll_FHSP_White/enroll_HStotal_White	p_ enroll_fhspW_totalW
LEP high school students enrolled in FHSP	enroll_FHSP_LEP/enroll_total_lep	p_ enroll_fhspL_totalL
Economically disadvantaged high school students enrolled in FHSP	enroll_FHSP_Eco/enroll_HSest_ecodis	p_ enroll_fhspE_totalE
Male high school students enrolled in FHSP	enroll_FHSP_Male/enroll_HStotal_male	p_enroll_fhspM_totalM
Female high school students enrolled in FHSP	enroll_FHSP_Female/enroll_HStotal_female	p_ enroll_fhspF_totalF

Total and student groups: Arts/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in Arts	enroll_Arts/enroll_FHSP_total	p_enroll_Arts_fhsp
Proportion of Black students in Arts of those enrolled in FHSP	enroll_Arts_Black/enroll_FHSP_Black	p_enroll_ArtsB_fhspB
Proportion of Hispanic students in Arts of those enrolled in FHSP	enroll_Arts_Hispanic/enroll_FHSP_Hispanic	p_enroll_ArtsH_fhspH
Proportion of White students in Arts of those enrolled in FHSP	enroll_Arts_White/enroll_FHSP_White	p_enroll_ArtsW_fhspW
Proportion of LEP students in Arts of those enrolled in FHSP	enroll_Arts_LEP/enroll_FHSP_LEP	p_enroll_ArtsL_fhspL
Proportion of economically disadvantaged students in Arts of those enrolled in FHSP	enroll_Arts_Eco/enroll_FHSP_Eco	p_enroll_ArtsE_fhspE

Proportion	Calculation	Variable Name
Proportion of male students in Arts of those enrolled in FHSP	enroll_Arts_Male/enroll_FHSP_Male	p_enroll_ArtsM_fhspM
Proportion of female students in Arts of those enrolled in FHSP	enroll_Arts_Female/enroll_FHSP_Female	p_enroll_ArtsF_fhspF

Total and student groups: Business/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in Business	enroll_Business/enroll_FHSP_total	p_enroll_Business_fhsp
Proportion of Black students in Business of those enrolled in FHSP	enroll_Business_Black/enroll_FHSP_Black	p_enroll_BusinessB_fhspB
Proportion of Hispanic students in Business of those enrolled in FHSP	enroll_Business_Hispanic/enroll_FHSP_Hispanic	p_enroll_BusinessH_fhspH
Proportion of White students in Business of those enrolled in FHSP	enroll_Business_White /enroll_FHSP_White	p_enroll_BusinessW_fhspW
Proportion of LEP students in Business of those enrolled in FHSP	enroll_Business_LEP/enroll_FHSP_LEP	p_enroll_BusinessL_fhspL
Proportion of economically disadvantaged students in Business of those enrolled in FHSP	enroll_Business_Eco/enroll_FHSP_Eco	p_enroll_BusinessE_fhspE
Proportion of male students in Business of those enrolled in FHSP	enroll_Business_Male/enroll_FHSP_Male	p_enroll_BusinessM_fhspM
Proportion of female students in Business of those enrolled in FHSP	enroll_Business_Female/enroll_FHSP_Female	p_enroll_BusinessF_fhspF

Total and student groups: Public/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in Public	enroll_Public/enroll_FHSP_total	p_enroll_Public_fhsp
Proportion of Black students in Public of those enrolled in FHSP	enroll_Public_Black/enroll_FHSP_Black	p_enroll_PublicB_fhspB
Proportion of Hispanic students in Public of those enrolled in FHSP	enroll_Public_Hispanic/enroll_FHSP_Hispanic	p_enroll_PublicH_fhspH

Proportion	Calculation	Variable Name
Proportion of White students in Public of those enrolled in FHSP	enroll_Public_White/enroll_FHSP_White	p_enroll_PublicW_fhspW
Proportion of LEP students in Public of those enrolled in FHSP	enroll_Public_LEP/enroll_FHSP_LEP	p_enroll_PublicL_fhspL
Proportion of economically disadvantaged students in Public of those enrolled in FHSP	enroll_Public_Eco/enroll_FHSP_Eco	p_enroll_PublicE_fhspE
Proportion of male students in Public of those enrolled in FHSP	enroll_Public_Male/enroll_FHSP_Male	p_enroll_PublicM_fhspM
Proportion of female students in Public of those enrolled in FHSP	enroll_Public_Female/enroll_FHSP_Female	p_enroll_PublicF_fhspF

Total and student groups: Multidisciplinary/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in Multidisciplinary	enroll_Multidisc/enroll_FHSP_total	p_enroll_Multidisc_fhsp
Proportion of Black students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_Black/enroll_FHSP_Black	p_enroll_MultidiscB_fhspB
Proportion of Hispanic students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_Hispanic/enroll_FHSP_Hispanic	p_enroll_MultidiscH_fhspH
Proportion of White students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_White/enroll_FHSP_White	p_enroll_MultidiscW_fhspW
Proportion of LEP students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_LEP/enroll_FHSP_LEP	p_enroll_MultidiscL_fhspL
Proportion of economically disadvantaged students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_Eco/enroll_FHSP_Eco	p_enroll_MultidiscE_fhspE
Proportion of male students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_Male/enroll_FHSP_Male	p_enroll_MultidiscM_fhspM
Proportion of female students in Multidisciplinary of those enrolled in FHSP	enroll_Multidisc_Female/enroll_FHSP_Female	p_enroll_MultidiscF_fhspF

Total and student groups: STEM/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in STEM	enroll_STEM/enroll_FHSP_total	p_enroll_STEM_fhsp
Proportion of Black students in STEM of those enrolled in FHSP	enroll_STEM_Black/enroll_FHSP_Black	p_enroll_STEMB_fhspB
Proportion of Hispanic students in STEM of those enrolled in FHSP	enroll_STEM_Hispanic/enroll_FHSP_Hispanic	p_enroll_STEMH_fhspH
Proportion of White students in STEM of those enrolled in FHSP	enroll_STEM_White/enroll_FHSP_White	p_enroll_STEMW_fhspW
Proportion of LEP students in STEM of those enrolled in FHSP	enroll_STEM_LEP/enroll_FHSP_LEP	p_enroll_STEML_fhspL
Proportion of economically disadvantaged students in STEM of those enrolled in FHSP	enroll_STEM_Eco/enroll_FHSP_Eco	p_enroll_STEME_fhspE
Proportion of male students in STEM of those enrolled in FHSP	enroll_STEM_Male/enroll_FHSP_Male	p_enroll_STEMM_fhspM
Proportion of female students in STEM of those enrolled in FHSP	enroll_STEM_Female/enroll_FHSP_Female	p_enroll_STEMF_fhspF

Total and student groups: ComboSTEM/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in ComboSTEM	enroll_ComboSTEM/enroll_FHSP_total	p_enroll_ComboSTEM_fhsp
Proportion of Black students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_Black/enroll_FHSP_Black	p_enroll_ComboSTEMB_fhspB
Proportion of Hispanic students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_Hispanic/enroll_FHSP_Hispanic	p_enroll_ComboSTEMH_fhspH
Proportion of White students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_White/enroll_FHSP_White	p_enroll_ComboSTEMW_fhspW
Proportion of LEP students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_LEP/enroll_FHSP_LEP	p_enroll_ComboSTEML_fhspL
Proportion of economically disadvantaged students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_Eco/enroll_FHSP_Eco	p_enroll_ComboSTEME_fhspE

Proportion	Calculation	Variable Name
Proportion of male students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_Male/enroll_FHSP_Male	p_enroll_ComboSTEMM_fhspM
Proportion of female students in ComboSTEM of those enrolled in FHSP	enroll_ComboSTEM_Female/enroll_FHSP_Female	p_enroll_ComboSTEMF_fhspF

Total and student groups: ComboNoSTEM/FHSP total

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in ComboNoSTEM	enroll_ComboNoSTEM/enroll_FHSP_total	p_enroll_ComboNoSTEM_fhsp
Proportion of Black students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_Black/enroll_FHSP_Black	p_enroll_ComboNoSTEMB_fhspB
Proportion of Hispanic students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_Hispanic/enroll_FHSP_Hispanic	p_enroll_ComboNoSTEMH_fhspH
Proportion of White students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_White/enroll_FHSP_White	p_enroll_ComboNoSTEMW_fhspW
Proportion of LEP students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_LEP/enroll_FHSP_LEP	p_enroll_ComboNoSTEML_fhspL
Proportion of economically disadvantaged students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_Eco/enroll_FHSP_Eco	p_enroll_ComboNoSTEME_fhspE
Proportion of male students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_Male/enroll_FHSP_Male	p_enroll_ComboNoSTEMM_fhspM
Proportion of female students in ComboNoSTEM of those enrolled in FHSP	enroll_ComboNoSTEM_Female/enroll_FHSP_Female	p_enroll_ComboNoSTEMF_fhspF

Student groups: Arts/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in Arts who are Black	enroll_Arts_Black/enroll_Arts	p_enroll_ArtsB_Arts
Proportion of students enrolled in Arts who are Hispanic	enroll_Arts_Hispanic/enroll_Arts	p_enroll_ArtsH_Arts
Proportion of students enrolled in Arts who are White	enroll_Arts_White/enroll_Arts	p_enroll_ArtsW_Arts

Proportion	Calculation	Variable Name
Proportion of students enrolled in Arts who are LEP	enroll_Arts_LEP/enroll_Arts	p_enroll_ArtsL_Arts
Proportion of students enrolled in Arts who are economically disadvantaged	enroll_Arts_Eco/enroll_Arts	p_enroll_ArtsE_Arts
Proportion of students enrolled in Arts who are male	enroll_Arts_Male/enroll_Arts	p_enroll_ArtsM_Arts
Proportion of students enrolled in Arts who are female	enroll_Arts_Female/enroll_Arts	p_enroll_ArtsF_Arts

Student groups: Business/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in Business who are Black	enroll_Business_Black/enroll_Business	p_enroll_BusinessB_Business
Proportion of students enrolled in Business who are Hispanic	enroll_Business_Hispanic/enroll_Business	p_enroll_BusinessH_Business
Proportion of students enrolled in Business who are White	enroll_Business_White/enroll_Business	p_enroll_BusinessW_Business
Proportion of students enrolled in Business who are LEP	enroll_Business_LEP/enroll_Business	p_enroll_BusinessL_Business
Proportion of students enrolled in Business who are economically disadvantaged	enroll_Business_Eco/enroll_Business	p_enroll_BusinessE_Business
Proportion of students enrolled in Business who are male	enroll_Business_Male/enroll_Business	p_enroll_BusinessM_Business
Proportion of students enrolled in Business who are female	enroll_Business_Female/enroll_Business	p_enroll_BusinessF_Business

Student groups: Public/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in Public who are Black	enroll_Public_Black/enroll_Public	p_enroll_PublicB_Public
Proportion of students enrolled in Public who are Hispanic	enroll_Public_Hispanic/enroll_Public	p_enroll_PublicH_Public
Proportion of students enrolled in Public who are White	enroll_Public_White/enroll_Public	p_enroll_PublicW_Public
Proportion of students enrolled in Public who are LEP	enroll_Public_LEP/enroll_Public	p_enroll_PublicL_Public
Proportion of students enrolled in Public who are economically disadvantaged	enroll_Public_Eco/enroll_Public	p_enroll_PublicE_Public

Proportion	Calculation	Variable Name
Proportion of students enrolled in Public who are male	enroll_Public_Male/enroll_Public	p_enroll_PublicM_Public
Proportion of students enrolled in Public who are female	enroll_Public_Female/enroll_Public	p_enroll_PublicF_Public

Student groups: Multidisciplinary/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in Multidisciplinary who are Black	enroll_Multidisc_Black/enroll_Multidisc	p_enroll_MultidiscB_Multidisc
Proportion of students enrolled in Multidisciplinary who are Hispanic	enroll_Multidisc_Hispanic/enroll_Multidisc	p_enroll_MultidiscH_Multidisc
Proportion of students enrolled in Multidisciplinary who are White	enroll_Multidisc_White/enroll_Multidisc	p_enroll_MultidiscW_Multidisc
Proportion of students enrolled in Multidisciplinary who are LEP	enroll_Multidisc_LEP/enroll_Multidisc	p_enroll_MultidiscL_Multidisc
Proportion of students enrolled in Multidisciplinary who are economically disadvantaged	enroll_Multidisc_Eco/enroll_Multidisc	p_enroll_MultidiscE_Multidisc
Proportion of students enrolled in Multidisciplinary who are male	enroll_Multidisc_Male/enroll_Multidisc	p_enroll_MultidiscM_Multidisc
Proportion of students enrolled in Multidisciplinary who are female	enroll_Multidisc_Female/enroll_Multidisc	p_enroll_MultidiscF_Multidisc

Student groups: STEM/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in STEM who are Black	enroll_STEM_Black/enroll_STEM	p_enroll_STEMB_STEM
Proportion of students enrolled in STEM who are Hispanic	enroll_STEM_Hispanic/enroll_STEM	p_enroll_STEMH_STEM
Proportion of students enrolled in STEM who are White	enroll_STEM_White/enroll_STEM	p_enroll_STEMW_STEM
Proportion of students enrolled in STEM who are LEP	enroll_STEM_LEP/enroll_STEM	p_enroll_STEML_STEM
Proportion of students enrolled in STEM who are economically disadvantaged	enroll_STEM_Eco/enroll_STEM	p_enroll_STEME_STEM

Proportion	Calculation	Variable Name
Proportion of students enrolled in STEM who are male	enroll_STEM_Male/enroll_STEM	p_enroll_STEMM_STEM
Proportion of students enrolled in STEM who are female	enroll_STEM_Female/enroll_STEM	p_enroll_STEMF_STEM

Student groups: ComboSTEM/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in ComboSTEM who are Black	enroll_ComboSTEM_Black/enroll_ComboSTEM	p_enroll_ComboSTEMB_ComboSTEM
Proportion of students enrolled in ComboSTEM who are Hispanic	enroll_ComboSTEM_Hispanic/enroll_ComboSTEM	p_enroll_ComboSTEMH_ComboSTEM
Proportion of students enrolled in ComboSTEM who are White	enroll_ComboSTEM_White/enroll_ComboSTEM	p_enroll_ComboSTEMW_ComboSTEM
Proportion of students enrolled in ComboSTEM who are LEP	enroll_ComboSTEM_LEP/enroll_ComboSTEM	p_enroll_ComboSTEML_ComboSTEM
Proportion of students enrolled in ComboSTEM who are economically disadvantaged	enroll_ComboSTEM_Eco/enroll_ComboSTEM	p_enroll_ComboSTEME_ComboSTEM
Proportion of students enrolled in ComboSTEM who are male	enroll_ComboSTEM_Male/enroll_ComboSTEM	p_enroll_ComboSTEMM_ComboSTEM
Proportion of students enrolled in ComboSTEM who are female	enroll_ComboSTEM_Female/enroll_ComboSTEM	p_enroll_ComboSTEMF_ComboSTEM

Student groups: ComboNoSTEM/total endorsement

Proportion	Calculation	Variable Name
Proportion of students enrolled in ComboNoSTEM who are Black	enroll_ComboNoSTEM_Black/enroll_ComboNoSTEM	p_enroll_CNoSTEMB_ComboNoSTEM
Proportion of students enrolled in ComboNoSTEM who are Hispanic	enroll_ComboNoSTEM_Hispanic/enroll_ComboNoSTEM	p_enroll_CNoSTEMH_ComboNoSTEM
Proportion of students enrolled in ComboNoSTEM who are White	enroll_ComboNoSTEM_White/enroll_ComboNoSTEM	p_enroll_CNoSTEMW_ComboNoSTEM
Proportion of students enrolled in ComboNoSTEM who are LEP	enroll_ComboNoSTEM_LEP/enroll_ComboNoSTEM	p_enroll_CNoSTEML_ComboNoSTEM
Proportion of students enrolled in ComboNoSTEM who are economically disadvantaged	enroll_ComboNoSTEM_Eco/enroll_ComboNoSTEM	p_enroll_CNoSTEME_ComboNoSTEM

Proportion	Calculation	Variable Name
Proportion of students enrolled in ComboNoSTEM who are male	enroll_ComboNoSTEM_Male/enroll_ComboNoSTEM	p_enroll_CNoSTEMM_ComboNoSTEM
Proportion of students enrolled in ComboNoSTEM who are female	enroll_ComboNoSTEM_Female/enroll_ComboNoSTEM	p_enroll_CNoSTEMF_CNoSTEM

Total and student groups: Distinguished/FHSP enroll

Proportion	Calculation	Variable Name
Proportion of students enrolled in FHSP in distinguished	enroll_dist_totalmf/enroll_FHSP_total	p_enroll_disting_fhsp
Proportion of Black students in distinguished of those enrolled in FHSP	enroll_dist_Black/enroll_FHSP_Black	p_enroll_distingB_fhspB
Proportion of Hispanic students in distinguished of those enrolled in FHSP	enroll_dist_Hispanic /enroll_FHSP_Hispanic	p_enroll_distingH_fhspH
Proportion of White students in distinguished of those enrolled in FHSP	enroll_dist_White/enroll_FHSP_White	p_enroll_distingW_fhspW
Proportion of LEP students in distinguished of those enrolled in FHSP	enroll_dist_lep/enroll_FHSP_LEP	p_enroll_distingL_fhspL
Proportion of economically disadvantaged students in distinguished of those enrolled in FHSP	enroll_dist_eco/enroll_FHSP_Eco	p_enroll_distingE_fhspE
Proportion of male students in distinguished of those enrolled in FHSP	enroll_dist_male/enroll_FHSP_Male	p_enroll_distingM_fhspM
Proportion of female students in distinguished of those enrolled in FHSP	enroll_dist_female/enroll_FHSP_Female	p_enroll_distingF_fhspF

Student groups: Distinguished/total distinguished

Proportion	Calculation	Variable Name
Proportion of students enrolled in distinguished who are Black	enroll_dist_Black/enroll_disting	p_enroll_distingB_disting
Proportion of students enrolled in distinguished who are Hispanic	enroll_dist_Hispanic /enroll_disting	p_enroll_distingH_disting

Proportion	Calculation	Variable Name
Proportion of students enrolled in distinguished who are White	enroll_dist_White/enroll_disting	p_enroll_distingW_disting
Proportion of students enrolled in distinguished who are LEP	enroll_dist_lep/enroll_disting	p_enroll_distingL_disting
Proportion of students enrolled in distinguished who are economically disadvantaged	enroll_dist_eco/enroll_disting	p_enroll_distingE_disting
Proportion of students enrolled in distinguished who are male	enroll_dist_male/enroll_disting	p_enroll_distingM_disting
Proportion of students enrolled in distinguished who are female	enroll_dist_female/ enroll_disting	p_enroll_distingF_disting

Total and student groups: STEM&ComboSTEM/distinguished total

Proportion	Calculation	Variable Name
Proportion of students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_total/ enroll_disting	p_enroll_SCS_disting
Proportion of Black students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_Black/enroll_disting	p_enroll_SCSB_disting
Proportion of White students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_Hispanic/enroll_disting	p_enroll_SCSH_disting
Proportion of Hispanic students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_White/enroll_disting	P_enroll_SCSW_disting
Proportion of LEP students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_LEP/ enroll_disting	p_enroll_SCSL_disting
Proportion of economically disadvantaged students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_Eco/ enroll_disting	p_enroll_SCSE_disting
Proportion of male students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_Male/enroll_disting	p_enroll_SCSM_disting
Proportion of students enrolled in distinguished who are in STEM&ComboSTEM	enroll_STEMComboStem_Female/enroll_disting	p_enroll_SCSF_disting

Student groups: STEM&ComboSTEM/distinguished

Proportion	Calculation	Variable Name
Proportion of Black students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_Black/enroll_dist_Black	p_enroll_SCS_distingB
Proportion of Hispanic students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_Hispanic/enroll_dist_Hispanic	p_enroll_SCSB_distingH
Proportion of White students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_White/enroll_dist_White	p_enroll_SCSH_distingW
Proportion of LEP students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_LEP/enroll_dist_lep	P_enroll_SCSW_distingL
Proportion of economically disadvantaged students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_Eco/enroll_dist_eco	p_enroll_SCSL_distingE
Proportion of male students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_Male/enroll_dist_male	p_enroll_SCSE_distingM
Proportion of male students who are in STEM or STEM Combo of those in distinguished	enroll_STEMComboStem_Female/enroll_dist_female	p_enroll_SCSM_distingF

Graduation Proportions

Total and student groups: FHSP/total graduates

Proportion	Calculation	Variable Name
Proportion of high school students graduated under FHSP	grad_fhsp_total/grad_total	p_grad_fhsp_total
Proportion of Black high school students graduated under FHSP of total	grad_FHSP_Black/grad_black	p_grad_fhspB_totalB
Proportion of Hispanic high school students graduated under FHSP	grad_FHSP_Hispanic/grad_hispanic	p_grad_fhspH_totalH
Proportion of White high school students graduated under FHSP	grad_FHSP_White/grad_white	p_grad_fhspW_totalW
Proportion of LEP high school students graduated under FHSP	grad_FHSP_LEP/grad_lep	p_grad_fhspL_totalL
Proportion of economically disadvantaged high school students graduated under FHSP	grad_FHSP_Eco/grad_eco	p_grad_fhspE_totalE

Total and student groups: Arts/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated under FHSP from Arts	grad_Arts/grad_fhsp_total	p_grad_Arts_fhsp
Proportion of Black students under Arts of those graduated from FHSP	grad_Arts_Black/grad_FHSP_Black	p_grad_ArtsB_fhspB
Proportion of Hispanic students under Arts of those graduated from FHSP	grad_Arts_Hispanic/grad_FHSP_Hispanic	p_grad_ArtsH_fhspH
Proportion of White students under Arts of those graduated from FHSP	grad_Arts_White/grad_FHSP_White	p_grad_ArtsW_fhspW
Proportion of LEP students under Arts of those graduated from FHSP	grad_Arts_LEP/grad_FHSP_LEP	p_grad_ArtsL_fhspL
Proportion of economically disadvantaged students under Arts of those graduated from FHSP	grad_Arts_Eco/grad_FHSP_Eco	p_grad_ArtsE_fhspE
Proportion of male students under Arts of those graduated from FHSP	grad_Arts_Male/grad_FHSP_Male	p_grad_ArtsM_fhspM
Proportion of female students from Arts of those graduated from FHSP	grad_Arts_Female/grad_FHSP_Female	p_grad_ArtsF_fhspF

Total and student groups: Business/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated from FHSP under Business	grad_Business/grad_fhsp_total	p_grad_Business_fhsp
Proportion of Black students from Business of those graduated under FHSP	grad_Business_Black/grad_FHSP_Black	p_grad_BusinessB_fhspB
Proportion of Hispanic students from Business of those graduated under FHSP	grad_Business_Hispanic/grad_FHSP_Hispanic	p_grad_BusinessH_fhspH
Proportion of White students from Business of those graduated under FHSP	grad_Business_White /grad_FHSP_White	p_grad_BusinessW_fhspW
Proportion of LEP students from Business of those graduated under FHSP	grad_Business_LEP/grad_FHSP_LEP	p_grad_BusinessL_fhspL

Proportion	Calculation	Variable Name
Proportion of economically disadvantaged students from Business of those graduated under FHSP	grad_Business_Eco/grad_FHSP_Eco	p_grad_BusinessE_fhspE
Proportion of male students from Business of those graduated under FHSP	grad_Business_Male/grad_FHSP_Male	p_grad_BusinessM_fhspM
Proportion of female students from Business of those graduated under FHSP	grad_Business_Female/grad_FHSP_Female	p_grad_BusinessF_fhspF

Total and student groups: Public/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated from FHSP under Public	grad_Public/grad_fhsp_total	p_grad_Public_fhsp
Proportion of Black students from Public of those graduated under FHSP	grad_Public_Black/grad_FHSP_Black	p_grad_PublicB_fhspB
Proportion of Hispanic students from Public of those graduated under FHSP	grad_Public_Hispanic/grad_FHSP_Hispanic	p_grad_PublicH_fhspH
Proportion of White students from Public of those graduated under FHSP	grad_Public_White/grad_FHSP_White	p_grad_PublicW_fhspW
Proportion of LEP students from Public of those graduated under FHSP	grad_Public_LEP/grad_FHSP_LEP	p_grad_PublicL_fhspL
Proportion of economically disadvantaged students from Public of those graduated under FHSP	grad_Public_Eco/grad_FHSP_Eco	p_grad_PublicE_fhspE
Proportion of male students from Public of those graduated under FHSP	grad_Public_Male/grad_FHSP_Male	p_grad_PublicM_fhspM
Proportion of female students from Public of those graduated under FHSP	grad_Public_Female/grad_FHSP_Female	p_grad_PublicF_fhspF

Total and student groups: Multidisciplinary/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated from FHSP under Multidisciplinary	grad_Multidisc/grad_fhsp_total	p_grad_Multidisc_fhsp

Proportion	Calculation	Variable Name
Proportion of Black students from Multidisciplinary of those graduated under FHSP	grad_Multidisc_Black/grad_FHSP_Black	p_grad_MultidiscB_fhspB
Proportion of Hispanic students from Multidisciplinary of those graduated under FHSP	grad_Multidisc_Hispanic/grad_FHSP_Hispanic	p_grad_MultidiscH_fhspH
Proportion of White students from Multidisciplinary of those graduated under FHSP	grad_Multidisc_White/grad_FHSP_White	p_grad_MultidiscW_fhspW
Proportion of LEP students from Multidisc of those graduated under FHSP	grad_Multidisc_LEP/grad_FHSP_LEP	p_grad_MultidiscL_fhspL
Proportion of economically disadvantaged students from Multidisc of those graduated under FHSP	grad_Multidisc_Eco/grad_FHSP_Eco	p_grad_MultidiscE_fhspE
Proportion of male students from Multidisciplinary of those graduated under FHSP	grad_Multidisc_Male/grad_FHSP_Male	p_grad_MultidiscM_fhspM
Proportion of female students from Multidisciplinary of those graduated under FHSP	grad_Multidisc_Female/grad_FHSP_Female	p_grad_MultidiscF_fhspF

Total and student groups: STEM/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated from FHSP under STEM	grad_STEM/grad_fhsp_total	p_grad_STEM_fhsp
Proportion of Black students from STEM of those graduated under FHSP	grad_STEM_Black/grad_FHSP_Black	p_grad_STEMB_fhspB
Proportion of Hispanic students from STEM of those graduated under FHSP	grad_STEM_Hispanic/grad_FHSP_Hispanic	p_grad_STEMH_fhspH
Proportion of White students from STEM of those graduated under FHSP	grad_STEM_White/grad_FHSP_White	p_grad_STEMW_fhspW
Proportion of LEP students from STEM of those graduated under FHSP	grad_STEM_LEP/grad_FHSP_LEP	p_grad_STEML_fhspL
Proportion of economically disadvantaged students from STEM of those graduated under FHSP	grad_STEM_Eco/grad_FHSP_Eco	p_grad_STEME_fhspE

Proportion	Calculation	Variable Name
Proportion of male students from STEM of those graduated under FHSP	grad_STEM_Male/grad_FHSP_Male	p_grad_STEMM_fhspM
Proportion of female students from STEM of those graduated under FHSP	grad_STEM_Female/grad_FHSP_Female	p_grad_STEMF_fhspF

Total and student groups: ComboSTEM/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated from FHSP under ComboSTEM	grad_ComboSTEM/grad_fhsp_total	p_grad_ComboSTEM_fhsp
Proportion of Black students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_Black/grad_FHSP_Black	p_grad_ComboSTEMB_fhspB
Proportion of Hispanic students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_Hispanic/grad_FHSP_Hispanic	p_grad_ComboSTEMH_fhspH
Proportion of White students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_White/grad_FHSP_White	p_grad_ComboSTEMW_fhspW
Proportion of LEP students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_LEP/grad_FHSP_LEP	p_grad_ComboSTEML_fhspL
Proportion of economically disadvantaged students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_Eco/grad_FHSP_Eco	p_grad_ComboSTEME_fhspE
Proportion of male students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_Male/grad_FHSP_Male	p_grad_ComboSTEMM_fhspM
Proportion of female students from ComboSTEM of those graduated under FHSP	grad_ComboSTEM_Female/grad_FHSP_Female	p_grad_ComboSTEMF_fhspF

Total and student groups: ComboNoSTEM/FHSP total

Proportion	Calculation	Variable Name
Proportion of students graduated from FHSP under ComboNoSTEM	grad_ComboNoSTEM/grad_fhsp_total	p_grad_ComboNoSTEM_fhsp
Proportion of Black students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_Black/grad_FHSP_Black	p_grad_ComboNoSTEMB_fhspB

Proportion	Calculation	Variable Name
Proportion of Hispanic students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_Hispanic /grad_FHSP_Hispanic	p_grad_ComboNoSTEMH_fhsp H
Proportion of White students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_White/gr ad_FHSP_White	p_grad_ComboNoSTEMW_fhs pW
Proportion of LEP students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_LEP/gra d_FHSP_LEP	p_grad_ComboNoSTEML_fhsp L
Proportion of economically disadvantaged students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_Eco/gra d_FHSP_Eco	p_grad_ComboNoSTEME_fhsp E
Proportion of male students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_Male/gr ad_FHSP_Male	p_grad_ComboNoSTEMM_fhs pM
Proportion of female students from ComboNoSTEM of those graduated under FHSP	grad_ComboNoSTEM_Female/ grad_FHSP_Female	p_grad_ComboNoSTEMF_fhsp F

Student groups: Arts/total arts

Proportion	Calculation	Variable Name
Proportion of students graduated from Arts who are Black	grad_Arts_Black/grad_Arts	p_grad_ArtsB_Arts
Proportion of students graduated from Arts who are Hispanic	grad_Arts_Hispanic/grad_Arts	p_grad_ArtsH_Arts
Proportion of students graduated from Arts who are White	grad_Arts_White/grad_Arts	p_grad_ArtsW_Arts
Proportion of students graduated from Arts who are LEP	grad_Arts_LEP/grad_Arts	p_grad_ArtsL_Arts
Proportion of students graduated from Arts who are economically disadvantaged	grad_Arts_Eco/grad_Arts	p_grad_ArtsE_Arts
Proportion of students graduated from Arts who are male	grad_Arts_Male/grad_Arts	p_grad_ArtsM_Arts
Proportion of students graduated from Arts who are female	grad_Arts_Female/grad_Arts	p_grad_ArtsF_Arts

Student groups: Business/total business

Proportion	Calculation	Variable Name
Proportion of students graduated from Business who are Black	grad_Business_Black/grad_Business	p_grad_BusinessB_Business
Proportion of students graduated from Business who are Hispanic	grad_Business_Hispanic/grad_Business	p_grad_BusinessH_Business
Proportion of students graduated from Business who are White	grad_Business_White/grad_Business	p_grad_BusinessW_Business
Proportion of students graduated from Business who are LEP	grad_Business_LEP/grad_Business	p_grad_BusinessL_Business
Proportion of students graduated from Business who are economically disadvantaged	grad_Business_Eco/grad_Business	p_grad_BusinessE_Business
Proportion of students graduated from Business who are male	grad_Business_Male/grad_Business	p_grad_BusinessM_Business
Proportion of students graduated from Business who are female	grad_Business_Female/grad_Business	p_grad_BusinessF_Business

Student groups: Public/total public

Proportion	Calculation	Variable Name
Proportion of students graduated from Public who are Black	grad_Public_Black/grad_Public	p_grad_PublicB_Public
Proportion of students graduated from Public who are Hispanic	grad_Public_Hispanic/grad_Public	p_grad_PublicH_Public
Proportion of students graduated from Public who are White	grad_Public_White/grad_Public	p_grad_PublicW_Public
Proportion of students graduated from Public who are LEP	grad_Public_LEP/grad_Public	p_grad_PublicL_Public
Proportion of students graduated from Public who are economically disadvantaged	grad_Public_Eco/grad_Public	p_grad_PublicE_Public
Proportion of students graduated from Public who are male	grad_Public_Male/grad_Public	p_grad_PublicM_Public
Proportion of students graduated from Public who are female	grad_Public_Female/grad_Public	p_grad_PublicF_Public

Student groups: Multidisc/total multidisciplinary

Proportion	Calculation	Variable Name
Proportion of students graduated from Multidisciplinary who are Black	grad_Multidisc_Black/grad_Multidisc	p_grad_MultidiscB_Multidisc

Proportion	Calculation	Variable Name
Proportion of students graduated from Multidisciplinary who are Hispanic	grad_Multidisc_Hispanic/grad_Multidisc	p_grad_MultidiscH_Multidisc
Proportion of students graduated from Multidisciplinary who are White	grad_Multidisc_White/grad_Multidisc	p_grad_MultidiscW_Multidisc
Proportion of students graduated from Multidisciplinary who are LEP	grad_Multidisc_LEP/grad_Multidisc	p_grad_MultidiscL_Multidisc
Proportion of students graduated from Multidisciplinary who are economically disadvantaged	grad_Multidisc_Eco/grad_Multidisc	p_grad_MultidiscE_Multidisc
Proportion of students graduated from Multidisciplinary who are male	grad_Multidisc_Male/grad_Multidisc	p_grad_MultidiscM_Multidisc
Proportion of students graduated from Multidisciplinary who are female	grad_Multidisc_Female/grad_Multidisc	p_grad_MultidiscF_Multidisc

Student groups: STEM/total STEM

Proportion	Calculation	Variable Name
Proportion of students graduated from STEM who are Black	grad_STEM_Black/grad_STEM	p_grad_STEMB_STEM
Proportion of students graduated from STEM who are Hispanic	grad_STEM_Hispanic/grad_STEM	p_grad_STEMH_STEM
Proportion of students graduated from STEM who are White	grad_STEM_White/grad_STEM	p_grad_STEMW_STEM
Proportion of students graduated from STEM who are LEP	grad_STEM_LEP/grad_STEM	p_grad_STEML_STEM
Proportion of students graduated from STEM who are economically disadvantaged	grad_STEM_Eco/grad_STEM	p_grad_STEME_STEM
Proportion of students graduated from STEM who are male	grad_STEM_Male/grad_STEM	p_grad_STEMM_STEM
Proportion of students graduated from STEM who are female	grad_STEM_Female/grad_STEM	p_grad_STEMF_STEM

Student groups: ComboSTEM/total ComboSTEM

Proportion	Calculation	Variable Name
Proportion of students graduated from ComboSTEM who are Black	grad_ComboSTEM_Black/grad_ComboSTEM	p_grad_ComboSTEMB_ComboSTEM

Proportion	Calculation	Variable Name
Proportion of students graduated from ComboSTEM who are Hispanic	grad_ComboSTEM_Hispanic/grad_ComboSTEM	p_grad_ComboSTEMH_ComboSTEM
Proportion of students graduated from ComboSTEM who are White	grad_ComboSTEM_White/grad_ComboSTEM	p_grad_ComboSTEMW_ComboSTEM
Proportion of students graduated from ComboSTEM who are LEP	grad_ComboSTEM_LEP/grad_ComboSTEM	p_grad_ComboSTEML_ComboSTEM
Proportion of students graduated from ComboSTEM who are economically disadvantaged	grad_ComboSTEM_Eco/grad_ComboSTEM	p_grad_ComboSTEME_ComboSTEM
Proportion of students graduated from ComboSTEM who are male	grad_ComboSTEM_Male/grad_ComboSTEM	p_grad_ComboSTEMM_ComboSTEM
Proportion of students graduated from ComboSTEM who are female	grad_ComboSTEM_Female/grad_ComboSTEM	p_grad_ComboSTEMF_ComboSTEM

Student groups: ComboNoSTEM/total ComboNoSTEM

Proportion	Calculation	Variable Name
Proportion of students graduated from ComboNoSTEM who are Black	grad_ComboNoSTEM_Black/grad_ComboNoSTEM	p_grad_ComboNoSTEMB_ComboNoSTEM
Proportion of students graduated from ComboNoSTEM who are Hispanic	grad_ComboNoSTEM_Hispanic/grad_ComboNoSTEM	p_grad_ComboNoSTEMH_ComboNoSTEM
Proportion of students graduated from ComboNoSTEM who are White	grad_ComboNoSTEM_White/grad_ComboNoSTEM	p_grad_ComboNoSTEMW_ComboNoSTEM
Proportion of students graduated from ComboNoSTEM who are LEP	grad_ComboNoSTEM_LEP/grad_ComboNoSTEM	p_grad_ComboNoSTEML_ComboNoSTEM
Proportion of students graduated from ComboNoSTEM who are economically disadvantaged	grad_ComboNoSTEM_Eco/grad_ComboNoSTEM	p_grad_ComboNoSTEME_ComboNoSTEM
Proportion of students graduated from ComboNoSTEM who are male	grad_ComboNoSTEM_Male/grad_ComboNoSTEM	p_grad_ComboNoSTEMM_ComboNoSTEM
Proportion of students graduated from ComboNoSTEM who are female	grad_ComboNoSTEM_Female/grad_ComboNoSTEM	p_grad_ComboNoSTEMF_ComboNoSTEM

Total and student groups: Distinguished/FHSP grad

Proportion	Calculation	Variable Name
Proportion of students graduated under FHSP on distinguished	grad_disting/grad_fhsp_total	p_grad_disting_fhsp
Proportion of Black students earning distinguished of those graduated from FHSP	grad_dist_Black/grad_FHSP_Black	p_grad_distingB_fhspB
Proportion of Hispanic students earning distinguished of those graduated from FHSP	grad_dist_Hispanic /grad_FHSP_Hispanic	p_grad_distingH_fhspH
Proportion of White students earning distinguished of those graduated from FHSP	grad_dist_White/grad_FHSP_White	p_grad_distingW_fhspW
Proportion of LEP students earning distinguished of those graduated from FHSP	grad_dist_lep/grad_FHSP_LEP	p_grad_distingL_fhspL
Proportion of economically disadvantaged students earning distinguished of those graduated from FHSP	grad_dist_eco/grad_FHSP_Eco	p_grad_distingE_fhspE
Proportion of male students earning distinguished of those graduated from FHSP	grad_dist_male/grad_FHSP_Male	p_grad_distingM_fhspM
Proportion of female students earning distinguished of those graduated from FHSP	grad_dist_female/grad_FHSP_Female	p_grad_distingF_fhspF

Total and student groups: Distinguished/total distinguished

Proportion	Calculation	Variable Name
Proportion of students graduated as distinguished who are White	grad_dist_total/ grad_disting	p_grad _disting
Proportion of students graduated as distinguished who are Black	grad_dist_Black/ grad_disting	p_grad_distingB_disting
Proportion of students graduated as distinguished who are Hispanic	grad_dist_Hispanic/ grad_disting	p_grad_distingH_disting
Proportion of students graduated as distinguished who are White	grad_dist_White/ grad_disting	p_grad_distingW_disting
Proportion of students graduated as distinguished who are LEP	grad_dist_lep/ grad_disting	p_grad_distingL_disting
Proportion of students graduated as distinguished who are economically disadvantaged	grad_dist_eco/ grad_disting	p_grad_distingE_disting

Proportion	Calculation	Variable Name
Proportion of students graduated as distinguished who are male	grad_dist_male/ grad_disting	p_grad_distingM_disting
Proportion of students graduated as distinguished who are female	grad_dist_female/ grad_disting	p_grad_distingF_disting

Student groups: STEM&ComboSTEM/distinguished

Proportion	Calculation	Variable Name
Proportion of Black students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_Black/ grad_dist_Black	p_grad_SCS_distingB
Proportion of Hispanic students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_Hispanic/grad_dist_Hispanic	p_grad_SCSB_distingH
Proportion of White students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_White/ grad_dist_White	p_grad_SCSH_distingW
Proportion of LEP students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_LEP/grad_dist_lep	P_grad_SCSW_distingL
Proportion of economically disadvantaged students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_Eco/grad_dist_eco	p_grad_SCSL_distingE
Proportion of male students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_Male/ grad_dist_male	p_grad_SCSE_distingM
Proportion of female students who are from STEM or STEM Combo of those on distinguished	grad_STEMComboStem_Female/grad_dist_female	p_grad_SCSM_distingF

Total and student groups: STEM&ComboSTEM/distinguished total

Proportion	Calculation	Variable Name
Proportion of students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_total/grad_disting	p_grad_SCS_disting

Proportion	Calculation	Variable Name
Proportion of Black students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_Black/ grad_disting	p_grad_SCSB_disting
Proportion of Hispanic students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_Hispanic/grad_disting	p_grad_SCSH_disting
Proportion of White students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_White/ grad_disting	P_grad_SCSW_disting
Proportion of LEP students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_LEP/grad_disting	p_grad_SCSL_disting
Proportion of economically disadvantaged students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_Eco/grad_disting	p_grad_SCSE_disting
Proportion of male students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_Male/ grad_disting	p_grad_SCSM_disting
Proportion of female students graduated as distinguished who are under STEM&ComboSTEM	grad_STEMComboStem_Female/grad_disting	p_grad_SCSF_disting

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